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## **Drinking Water Surveillance Program**

# **OVERVIEW ANNUAL REPORT**

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DRINKING WATER SURVEILLANCE  
PROGRAM

OVERVIEW ANNUAL REPORT 1987

HAZARDOUS CONTAMINANTS  
COORDINATION BRANCH  
135 ST. CLAIR AVENUE WEST  
TORONTO, ONTARIO M4V 1P5

ONTARIO MINISTRY OF THE ENVIRONMENT  
JUNE 1989

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## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP is designed to eventually include all municipal supplies in Ontario. Currently, raw, treated and distributed water at 44 water supply systems is being monitored. Analysis for up to 180 parameters is carried out on each water sample, including microbiological, organic and inorganic substances as well as process parameters.

A full evaluation of the bacteriological quality of the water can only be accomplished by referring to the results of routine bacteriological monitoring carried out by the operating authority. The limited monitoring in the DWSP revealed the presence of coliforms and/or fecal coliforms occasionally in treated or distributed waters of a few supplies.

Most supplies exceeded the aesthetic Ontario Drinking Water Objectives (ODWOs) for organic nitrogen and temperature and some exceeded the ODWO for colour. The operational guideline for residual aluminum was exceeded at least occasionally in more than half of the distributed waters.

Recommended levels of fluoride were not maintained in all of the supplies, as measured by the DWSP.

More than 18,300 tests for metals such as lead, copper, iron and zinc were carried out on treated and distributed water. Lead was the only metal found above a health-related ODWO limit, and only on one occasion at one location in the treated water at the plant; levels in distributed water were normal and resampling did not confirm its presence. No other health-related ODWOs for metals were exceeded.

The health-related ODWO for nitrate was exceeded in only one sample of distributed water in a supply from a predominantly agricultural area; subsequent samples were below the maximum acceptable concentration.

The health-related ODWO for turbidity was exceeded occasionally at a few supplies.

Chloroaromatic compounds were analyzed 11,699 times on treated and distributed waters; only the following were found at quantifiable levels:

1,2,3,5-Tetrachlorobenzene	(2)
1,2,4,5-Tetrachlorobenzene	(1)
2,3,6-Trichlorotoluene	(2)
Hexachloroethane	(12)

2,006 tests for polynuclear aromatic hydrocarbons were performed on treated water at the treatment plants; only three were found at quantifiable levels:

Benzo(k)fluoranthene	(2)
Fluoranthene	(2)
Pyrene	(2)

Over 32,600 analyses for pesticides were completed on samples of treated and distributed water; the only pesticides found above trace levels were:

Lindane	(1)
Atrazine	(3)
Atraton	(1)
Endosulphan sulphate	(1)
Bladex	(3)
Metolachlor	(1)

No polychlorinated biphenyls (PCBs) were found in any samples of treated or distributed water.

A total of 24,413 tests for volatile substances were carried out on treated and distributed water; the ODWO for total trihalomethanes was exceeded in one sample of distributed water; other volatile organic substances found at quantifiable levels were:

1,2-Dichloroethane	(1)
1,1,1-Trichloroethane	(12)
Tetrachloroethylene	(2)
Benzene	(4)
Ethylbenzene	(1)
Xylenes	(9)
Toluene	(20)

The numbers in parentheses indicate the number of times the compound was found.

The levels of these organic compounds found, while quantifiable, were relatively low, and all levels were well below any available health-related guidelines.

No other health-related guidelines for organic substances were exceeded.

The water quality produced by all of the water supply systems on the DWSP for 1987 was good.

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DRINKING WATER SURVEILLANCE PROGRAM  
OVERVIEW FOR 1987 AND ANNUAL REPORTS

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently 44 water supply systems are being monitored. Appendix A contains a detailed description of the DWSP. Direction for the program is provided through the DWSP steering committee made up of representatives from the regions, laboratory and drinking water section staff of the Ministry of the Environment.

The water supply systems included in the DWSP during 1987 are shown in Table I.

At each water supply system, water samples were obtained from DWSP approved locations, for raw and treated water and generally at two sites in the distribution system. Where possible one distribution system site was selected close to the treatment plant, the other further to the periphery of the distribution system.

The plant raw water was sampled prior to the addition of any treatment chemicals, whilst the plant treated water was obtained after the completion of all treatment processes. Sample lines in the plant were flushed prior to sampling to ensure that the water was indicative of its origin and not residual water standing in the line.

At all distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analysis carried out on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point in order to evaluate the effects of treatment and travelling time. This was done by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and the treated sampling.

Stringent DWSP protocols were followed to eliminate any variation in sample taking methodology (Appendix B).

The flow (plant volume for day of sampling), treatment chemical dosages and field chemistry measurements such as turbidity, chlorine residuals, pH and temperature were recorded on the day of sampling and entered into the DWSP database. These measurements were used to relate plant operational conditions on the day of sampling to the analytical results obtained in the samples from that day.

During 1987 analysis for up to 180 parameters (selection criteria outlined in APPENDIX A) was carried out on each water sample, including microbiological, organic and inorganic substances as well as process parameters. These parameters are listed alphabetically within the analytical scan in Table II, along with analytical detection limits and associated guidelines. Where Ontario Drinking Water Objectives (ODWOs) are not available, appropriate guidelines from other agencies have been provided. The program provides for the addition of parameters in the future where warranted as a result of such factors as: specific local concerns; availability of analytical techniques; additional information on health effects.

## RESULTS

An executive summary of analyses completed for all water supplies on DWSP is shown in Table III.

The executive summary for each water supply system is presented in Appendix C. Table 1 is a summary table by scan, providing information on the number of tests completed and the number and percentage of positive results obtained within each scan for each water sample type. The number and type of guideline exceedence is also noted.

A positive result denotes a value that is greater than the statistical limit of detection established by the Ministry of the Environment(MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the analytical detection limit that it cannot be confidently quantified. High numbers of positives are to be expected for many metal and chemistry parameters since they are naturally occurring in the environment.

A block schematic of the plant process, (Figure 2), and a general information table (Table 2) is also provided in the executive summary of each supply.

Complete analytical results are outlined in the individual reports for plants listed in Table I.

## DISCUSSION

Water quality is judged by comparison with the ODWOs, as defined in the 1983 publication (ISBN 0-7743-8985-0). The Province of Ontario has health-related and aesthetic objectives for 49 parameters; these are currently under review. When an ODWO is not available, guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the Ministry of the Environment catalogues and keeps current over 750 guidelines for 1750 parameters from agencies throughout the world.

A guideline value represents the level (a concentration or a number) of a constituent that ensures an aesthetically pleasing water and/or does not result in any significant risk to the consumer over a lifetime.

Aesthetic considerations provide a basis for drinking water objectives because water should be pleasant to drink. An aesthetic guideline is derived upon review of information about the parameter or substance relating to its capability of causing taste and odour, colour or cloudiness in water, or to cause encrustation and excessive soap consumption. For certain parameters (ie. the chlorobenzenes and pentachlorophenol) for which aesthetic guidelines are derived, health-related guidelines are also derived. Further where only aesthetic guidelines are specified, the values are below those considered to constitute a health hazard. The setting of aesthetic guidelines therefore also involves a full review of the toxicological properties of the substance or parameter.

For drinking water, most health related guidelines are based on the assumption that water will be consumed by a 70kg person at the rate of 1.5 to 2L per day, over a period of seventy years. The guideline values therefore describe the quality of water that is acceptable for lifelong consumption; accordingly short term deviations above the guideline values do not necessarily mean that the water is unsuitable for consumption. The amount and duration that any guideline value can be exceeded without affecting public health depends upon the specific substance involved.

In 1974, a Federal/Provincial Working Group on Drinking Water was formed under the auspices of the Federal/Provincial Advisory Committee on Environmental and Occupational Health which reports to a committee of provincial Deputy Ministers of Health. This Working Group was formed to ensure consistency in guideline development on a national scale. It was decided after the 1978

revision of the Canadian Drinking Water Guidelines document, to raise the status of the Working Group to a permanent Subcommittee on Drinking Water. This change reflected the increased emphasis given by the parent Committee to drinking water contaminants.

Ontario usually adopts the Canadian Drinking Water Guidelines as ODWOs, although for certain parameters Ontario's limits may be more stringent; further Ontario may set its own limits for some substances.

As stated under Results, traces do not indicate quantifiable values as defined by established MOE Laboratory analytical protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. Discussion of guidelines and limits therefore, is only conducted on positive results.

### Bacteriology

Bacteriological analysis is carried out on DWSP to complement the other analyses and to provide as full information as possible for each sample. Due to the sampling frequency of the DWSP, full evaluation of the bacteriological quality of the waters surveyed could not be made. Such evaluation is possible only as a result of the bacteriological monitoring as recommended in the ODWOs, which is carried out by the operating authority; this calls for sampling at substantially more distribution system sites, and on at least a weekly basis. Larger supply systems, such as those serving more than 100,000 people, would be required to take more than 100 samples from distribution system sites in the course of one month, with some samples being taken each day.

Some general trends are however evident from the bacteriological analysis completed during 1987. At most locations where surface waters are used as a source, there is evidence of the presence in the raw water of organisms characteristic of pollution from sewage or run-off. Groundwater sources are generally free from such organisms.

Although there were 13 water supply locations where the ODWO for total and/or fecal coliforms was exceeded in treated or distribution system site samples, and unsafe water quality was therefore indicated, bacteriological quality was generally good. It is important to restate that accurate, in depth judgements on water quality, cannot be based on results of only a few samples.

Standard plate count is a test used to supplement routine analysis for coliform bacteria; it can be used for quality control in water treatment plants and as a measure of quality deterioration in distribution lines or reservoirs. High standard plate counts can indicate that bacterial growth is occurring in the distribution system. This can occur as a result of inadequate treatment of the water at the plant, the presence of organic material in the distribution system, the lack of an adequate

chlorine residual in the distribution system or an increase in temperature. A sudden increase in standard plate count can indicate contamination of the water in the distribution system due to a cross-connection or other source of pollution.

The ODWO limit of 500 organisms/mL is based on a geometric mean of 5 or more samples. At 14 of the locations, there was evidence that some deterioration in bacteriological quality was occurring in the distributed water, as evidenced by elevated standard plate counts in one or both of the samples (Table IV); insufficient samples were available to fully evaluate compliance with the objective limit. In most instances fairly high temperatures in excess of 20 °C were recorded in the distributed water containing the high counts; chlorine residuals measured in these samples were sometimes very low.

Temperature is one of the main factors governing the growth of bacteria. Temperature of distributed water becomes elevated in most supplies over the summer and early fall months. It is recognized that it is generally not possible to control the temperature of the distributed water, since this is largely determined by the temperature of the raw water source. Most raw water from surface supplies exceeded the ODWO at some time during the warmer months of the year. Further, once water enters the distribution system, it usually becomes warmed within the pipes. The results show that there is a tendency for bacterial multiplication to occur (as shown by increases in the standard plate count, particularly) when temperatures in the distributed water exceed the objective level of 15°C. This was observed in June, July, August and September.

Operating authorities should be aware of this potential for deteriorating bacteriological quality, and pay close attention to the chlorine residual applied to water leaving the plant to ensure that it is maintained throughout the distribution system. Excessive bacterial growth in the system can give rise to slime formation, taste and odour problems and corrosion. As well, the presence of coliform indicator bacteria can be masked, and consequently the bacteriological safety of the supply cannot be properly assessed.

Efficient operation at the water treatment plant, combined with a vigorous program of distribution system maintenance would also ensure improved quality by limiting the amount of organic material, which serves as a nutrient source for bacteria, entering the system.

## Inorganic and Physical Parameters

### Laboratory and Field Chemistry

Field chemistry measurements include those for chlorine residual, pH, temperature and turbidity, and they are performed on site at the time the samples are taken. These data, along with sample day conditions (dosages of treatment chemicals, flows and retention

times) at the treatment plant, provide background information for the laboratory analysis results. They enable interpretation of other analytical results in the context of plant operation practice at the time of sampling. The results of the field measurements were entered into the DWSP database as submitted.

A review of these data indicates that some results were entered incorrectly on the submission sheets; for example at some water supply locations, total residuals were entered as combined or vice versa. There were also occasions when data for the sample day conditions (flow rates at the treatment plant, dosage of treatment chemicals on the day of sampling etc) were not supplied. The importance of correct and complete entry of data cannot be stressed enough since comprehensive interpretation of analytical data is not generally possible unless all the figures are made available; recommendations for improved operational practice can not then be made. Plant data (including chemicals added on day of sampling) are also incomplete.

Four of the Laboratory and Field chemistry parameters are health related - cyanide, fluoride, nitrate and turbidity.

**Cyanide** was rarely found above detection limits at any location; consideration is being given to reducing the frequency of analysis of this parameter. Since cyanide is unlikely to originate in the distribution system, restriction of analysis to only raw and treated water would seem appropriate.

The presence of small amounts of fluoride in drinking water leads to a substantial reduction in dental caries, particularly among children. The ODWO for **fluoride** is 2.4 mg/L and this was not exceeded in any supply. Where fluoridation is practised, the fluoride concentration recommended is 1.2 mg/L and deviation from this optimum should not exceed + or - 0.2 mg/l. The DWSP data reveal that the optimum level of fluoride is not always maintained in fluoridated supplies and in some instances was not being added on a continuous basis. Of the twenty-four supplies that fluoridate, the fluoride levels were outside of the recommended range in at least one treated or distributed water sample at twenty-two locations (Table V). At six supplies the recommended level was not maintained in more than 50 percent of the samples, at another six supplies it was not maintained more than twenty-five percent of the time. While it appeared that the recommended range was not maintained at Amherstburg, Lorne Park and Port Stanley the amount of data was insufficient to make an assessment of the overall fluoridation practice.

At least one water supply location indicated that the results of their own tests at the treatment plant showed that the dosage of fluoride being added resulted in the recommended level being maintained in the treated water leaving the plant, even though DWSP test results suggested underdosing. Such differences may be a reflection of differences in the analytical techniques used. Water treatment operational personnel are advised (ODWO revised 1983) to confirm the average dosage of fluoride on a daily basis, by checking the level of fluoridating chemical in the day tank,

and employing the amount used, along with the daily flow, in a calculation of the dose actually added.

The Maximum Acceptable Concentration (MAC) of **nitrate** in drinking water is 10 mg/L. It is based on consideration of the relationship between infantile methemoglobinemia (blue baby syndrome) and the presence of nitrate in drinking water. The presence of nitrate above 10 mg/L in water commands caution. Where the MAC is known to be exceeded, the public should be informed by the appropriate health authority of the potential dangers of using the water for infant feeding. The MAC for nitrate was exceeded at one water supply location, when it was found at 11.7 mg/L in one sample of the treated water at DRESDEN. The source water for the Dresden water supply, the Sydenham River, drains a predominantly agricultural area, and elevated levels of nitrate would not be unexpected as a result of the widespread use of nitrate fertilizers. A Water Plant Optimization Study is being conducted to investigate remedies for this situation.

**Turbidity** in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO of 1FTU (Formazin Turbidity Unit) is only applicable to water leaving the treatment plant. According to laboratory turbidity results this objective was exceeded 10 times and occurrences were at 8 different plants (Table VI). For those samples that had high turbidity values the limited analysis did not indicate adverse bacteriological results.

For the DWSP, turbidity is measured both as a field parameter and in the laboratory; in addition, at the majority of supply locations, the finished water turbidity is measured either continuously or several times during the day. A review of these data reveals some discrepancies between these various turbidity measurements. Similarly, the field **pH** results reported at the time of sampling differ from the values reported by the laboratory for many locations; the difference can be as much as a full pH unit. This may be a result of the different methods of analysis, the time delay before the samples are analysed at the laboratory, the colour being bleached by the chlorine in the treated water or some other mechanism. The reasons for both pH and turbidity discrepancies are being investigated.

There are some ODWOs which have been set for parameters included in the Laboratory and Field Chemistry scans, based on aesthetic considerations. These parameters do not directly affect the safety of a water supply, but may render the water objectionable or unsuitable for use as a piped supply. The primary goal in setting limits on the basis of aesthetic considerations is to produce a treated water that pleases the consumers. Where aesthetic objectives are set the values are below those considered to constitute a health hazard.

**Organic nitrogen** values exceeded the ODWO of 0.15 mg/L in many samples at most of the supply locations (Table VII). The organic nitrogen limit was set in recognition of the possibility of the development of taste and odour problems in the distributed water should the objective level be exceeded. Further investigation and discussion regarding the calculation of this parameter value (Total Kjeldahl Nitrogen minus Ammonia) has indicated that for most treated drinking waters the error inherent in the measurement of Total Kjeldahl Nitrogen may be greater than the actual limit (personal communication with Dr. Ross McCurdy, Technical University of Nova Scotia). Based on this information and the results obtained from the DWSP, which generally indicates no such problems when this objective was exceeded, the guideline may be modified when the ODWOs are reviewed.

**Colour** is a physical parameter which is used by many consumers to judge the quality and acceptability of drinking water. Colour may be due to the presence of natural or synthetic organic substances, as well as certain metallic ions most notably iron and manganese. Colour becomes noticeable to the consumer at levels greater than the Maximum Desirable Concentration of 5 True Colour Units (platinum/cobalt scale). Although this level was exceeded more often in the standing samples from the distribution system (indicating some deterioration in quality as the water remained in the plumbing overnight), it was exceeded in some free flow samples in the distributed waters in some supplies (Table VIII). Operating personnel did not report any associated consumer complaints.

It is desirable that the **temperature** of drinking water be less than 15°C; the palatability of water is enhanced by its coolness, since taste and odour perception are affected by temperature. Maintenance of low temperatures will tend to reduce the growth of bacteria in the distribution system and thus minimize any associated taste, colour, odour and corrosion problems. The objective temperature level was exceeded in distributed water at most of the water supply locations (Table IX). This occurred predominantly from June/July through September, corresponding to the period when both source water and air temperatures would be the highest. The importance of recognizing the above-noted problems associated with temperature increases in plant operational practice must be stressed (see also "Bacteriology").

At some supplies, predominantly those with groundwater sources, other aesthetic drinking water guidelines were exceeded. These were hardness, and hardness related guidelines.

The ODWO recommend a **hardness** level of between 80 and 100 mg/L as calcium carbonate for domestic waters, to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor (Table X), and would possess a tendency to form scale deposits and result in excessive soap consumption.

Supplies using the Great Lakes as a source generally exhibited hardness levels between 100 and 120 mg/L, and were considered close to the ideal hardness level.

The groundwater sources at KITCHENER and STOUFFVILLE, and the surface water sources at BRANTFORD, ALVINSTON and DRESDEN exceeded the 200 mg/L level for hardness, and would thus be considered in the "poor" category for hardness. The source water at Brantford is the Grand river, the watershed of which drains a limestone area; hardness components would thus tend to be leached from the surrounding geological formations. In the case of Alvinston and Dresden a considerable contribution to river flow originates in an area of sand plains. The 200 mg/L guideline was also exceeded at DOAN'S HOLLOW supply (Port Dover) where the infiltration pond is located in a sand plain area. The occasionally elevated levels in the Port Dover distribution system probably reflects the mixing of treated water from the two sources.

Parameters related to hardness ie. conductivity and residue were also high in many samples from these same locations.

#### Metals

Examination of the results of the metals scan showed that the conventional water treatment process (coagulation, settling followed by filtration) effects removal of some metals (eg. Iron, Manganese, Copper, Zinc) from water. With few exceptions, the levels of these metals in the treated waters were lower than those in the raw source waters.

As well, at most locations, there was evidence that metals such as copper, iron and zinc, and sometimes cadmium, lead and nickel, were leached from the household plumbing during the overnight period; metal levels in the 'standing' samples tended to be higher than those in the 'free-flow' samples. The actual severity of the leaching depended upon the aggressiveness of the water, and the materials used in the plumbing system determined the metals which showed elevated levels.

At only one location was there a health-related ODWO for metals exceeded in a free flow sample; a level of 9.8 mg/L of **lead** was detected in one treated water sample in WINDSOR. This level was not found in the corresponding distribution system site samples, nor was it found subsequently in the treated water; it was therefore considered to be a questionable result.

The ODWO for lead was exceeded in only one standing sample from distribution system sites at BRANTFORD, BURLINGTON, the LAKE HURON Supply, the LEMIEUX ISLAND plant in OTTAWA, ST. CATHARINES and WALLACEBURG and twice at the same site at NORTH BAY. Such results indicate the probability of a lead component leaching from the household plumbing. ODWOs however are only applied to water at the free flowing outlet of the ultimate consumer. An ongoing Environment Ontario study is examining the significance of the contribution of lead in drinking water to human health.

The aesthetic ODWO for iron was exceeded in some distribution system site free flow samples from a number of supplies and in some standing samples (Table X); this again shows the tendency for leaching of plumbing system components as the water stands for a period of time; in some cases the high iron levels were accompanied by increases in turbidity, which may have indicated that pipe sediment containing deposited iron was being disturbed at the time of sampling.

**Aluminum** is the third most abundant element in nature, which accounts for its presence in practically all natural waters. Where aluminum based coagulants are used in water treatment, the measure of residual aluminum in the treated water is important, because it is an indication of the efficiency of the treatment process. As well, too high a residual aluminum can result in distribution system coating with consequent increased energy requirements (for pumping water through the system) and cause interferences with certain industrial processes.

At present there is no evidence that aluminum is physiologically harmful and no health limit has been specified. However, to avoid the above-noted problems, a useful guideline is to maintain a residual below 0.1mg/L as aluminum leaving the plant.

At more than two-thirds of the supplies where aluminum based coagulants were used, analyses reveal that this operational guideline was exceeded at least occasionally; at some locations it was exceeded most of the time (Table XI). This may be an indication that the control over plant operations is not as rigorous as it should be. The Water Plant Optimization Study (WPOS), which is being implemented at water treatment plants simultaneously with DWSP, is designed to address plant operational problems such as this and will provide advice on corrective action.

**Mercury** is a toxic element and the major source of human exposure is through food consumption. The ODWO for mercury is 1.0 ug/L, this level was not exceeded in any supply. As the preservative deteriorates mercury levels measured in samples may increase as a result of interferences and the preservative is replaced. Since the distribution system would not be expected to contribute mercury to the water consideration should be given to eliminating analysis for mercury in distributed waters.

It has been observed that potassium dichromate, a preservative for **mercury** samples, has a limited shelf-life and may show false positives for the presence of mercury.

#### Organic Substances Detected in Treated Water

Organic substances may be naturally present in water or as a result of industrial or agricultural activities or long range airborne transportation. They may be of concern as a result of a potential to cause adverse health effects when present in

drinking water. A total of 87968 organic analyses were performed on treated water samples. Aside from trihalomethanes and phenolics 84 positives were detected on 21 different organic substances (Table XII). In most cases these were isolated occurrences.

#### Chloroaromatics

Thirteen chloroaromatic compounds are analyzed for in DWSP. The total number of chloroaromatic analyses completed on treated waters at the water supply locations during 1987 was 11699. Of these, only seventeen yielded positive results representing four compounds.

**1,2,3,5-Tetrachlorobenzene** was found once in a distribution system site sample at BRANTFORD, at 13 ng/L and once in a treated water sample at the LAMBTON AREA (SARNIA) water plant at 11 ng/L.

There is currently no ODWO or Canadian Drinking Water Guideline for 1,2,3,5-tetrachlorobenzene. Although no drinking water limit exists for this substance, the United States Environmental Protection Agency (US EPA) has set an ambient water quality (AWQ) guideline of 38000ng/L for the more toxic isomer, 1,2,4,5-tetrachlorobenzene. AWQ guidelines are designed to ensure that surface water, used as a source of drinking water and from which fish are consumed, does not contain substances at levels that would be hazardous to human health. Since both water and fish consumption are considered, AWQ guidelines are usually more stringent than any corresponding drinking water guideline. Both the positive findings were well below the AWQ guideline for 1,2,3,4-tetrachlorobenzene.

**1,2,4,5-Tetrachlorobenzene** was found once at one location, AMHERSTBURG, at 36 ng/L, in the treated water. This is about 1000 times less than the AWQ guideline for 1,2,4,5-tetrachlorobenzene.

**2,3,6-Trichlorotoluene** was found once at two locations. A level of 56 ng/L was recorded in a distribution site sample at BELLEVILLE and 51 ng/L in the treated water at PETERBOROUGH.

There is currently no applicable drinking water guideline available for this substance.

**Hexachloroethane** was found at seven of the water supply systems included on the DWSP. Quantifiable levels were detected in the treated waters once at HAMILTON and NIAGARA FALLS, once in a distribution system site at PORT DOVER and NIAGARA FALLS and twice in distribution sites at BELLEVILLE, KINGSTON, OTTAWA (LEMIEUX ISLAND) and the UNION WATER SUPPLY SYSTEM. The levels found ranged from 11 ng/L to 16 ng/L.

There is currently no ODWO or Canadian drinking water guideline available for hexachloroethane. However the US EPA has set an AWQ guideline for this substance of 1900 ng/L.

Other chloroaromatics, such as other **chlorotoluenes**, various **trichlorobenzenes** and **hexachlorobutadiene**, as well as those listed above, were found at trace levels at most of the other supplies, on an occasional basis.

A review of the results of chloroaromatic analysis indicates that certain chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could be due to a reaction of chlorine with organics present in the water or in the distribution system.

### Chlorophenols

Six chlorophenols are analysed for on DWSP, and a total of 456 analyses for chlorophenols were completed on the treated water. No positive result was obtained.

Traces of chlorophenols were found at some supplies, and only on a very occasional basis.

### Routine Pesticides

Twenty-four pesticides are analyzed for routinely in treated water on the DWSP for a total of 21109 analyses. Only three pesticides were found above trace levels in treated waters; **atratone** was found once in a distribution system site sample on the Lambton Area (Sarnia) supply at 680 ng/L; there is currently no ODWO or Canadian Drinking Water Guideline for this pesticide; no applicable drinking water guideline from other agencies could be found. The result is questionable since atratone is an experimental pesticide that has not been released in North America.

**Lindane** was found once in a distribution system site at BRANTFORD at 11 ng/L and **thiodan sulphate** (endosulfan sulphate) was found at 46 ng/L in the treated water at the GRIMSBY supply. The ODWO for the former pesticide is 4000 ng/L; no drinking water guideline is available for thiodan sulphate.

**Lindane** and **alpha-BHC** are found on a regular basis at trace levels in all surface water supplies; they must therefore be considered to be ubiquitous. Although trace levels are not generally considered significant, the repeated detection of lindane and its metabolite can be regarded a confirmation of the definite presence of these compounds at the reported levels.

Other routine pesticides were only found occasionally at trace levels, predominantly in those water supplies using surface sources in areas where agriculture is practised.

## Specific Pesticides

Forty specific pesticides are analysed in the DWSP; usually only twice per year at each water supply system, yielding a total of 10196 analyses in treated water. There were seven positive results.

**Atrazine** was found in treated waters at three water supplies above trace levels. ALVINSTON recorded a level of 1700 ng/L in the treated water on one occasion, BRANTFORD showed a level of 670 ng/L in one distribution system site sample and DRESDEN'S treated water contained 13900 ng/L once.

An Interim Maximum Acceptable Concentration (IMAC) of 60,000 ng/L for atrazine is included in the Canadian Drinking Water Guidelines of 1987, and all occurrences were well below this guideline.

**Bladex** was also found in treated water at three supplies, at 3680 ng/L at DRESDEN in treated water, and at 1800 ng/L at Sarnia and at 1140 ng/L at PETERBOROUGH in distribution system site samples. Trace levels of atrazine were also found in the samples which were positive for Bladex along with traces of other pesticides; these pesticides were not found at any other location. These results may be questionable since they indicate the possibility of an interference with laboratory analysis. For comparison purposes the Canadian Drinking Water Guideline for bladex is 10000 ng/L.

**Metolachlor** was detected once, in the treated water from DRESDEN. The level of 6650 ng/L is well below the IMAC from the Canadian Drinking Water Guidelines of 50000 ng/L.

The addition of powdered activated carbon (PAC) is carried out at some of the treatment plants in the Southwest Region; the plants are Alvinston, Amherstburg, Harrow, Walpole Island, Wallaceburg, Union Water Supply, Mitchell's Bay and Dresden. In most, the addition is made on a seasonal basis.

Where dosages of PAC have been entered in sample day conditions by plant operating personnel, they are generally below 5ppm, although the dose at Walpole Island was generally above 5ppm and was as high as 12ppm on the day of sampling on one occasion.

Assessment of the efficiency of activated carbon treatment is difficult since most of the occurrences of contaminants were at trace levels in both raw and treated waters. These traces, of alpha-BHC for example were not usually removed by the activated carbon applied. At Dresden, quantifiable levels of Atrazine, Bladex and Metolachlor were found in the raw water which were not removed by the activated carbon addition; the dose of activated carbon applied was not available for the sample day.

Studies have shown that PAC applied at dosages used for treating taste and odour control can be sufficient to meet water quality goals when removal requirements do not exceed 80 percent (AWWA

Journal, Vol.81 No.1, January 1989). Increasing the dosage of PAC to 40-50ppm would significantly reduce the levels of pesticides at times when these would be expected to be present in the raw waters.

Pesticides reach drinking water because of contamination of the raw water source as a result of agricultural/domestic use of the products. Analysis for pesticides in the raw and treated water only should be sufficient.

#### Polychlorinated Biphenyl (PCB)

Polychlorinated biphenyls are among the most ubiquitous and persistent pollutants in the global ecosystem. Their use in Canada is currently being phased out.

1303 analyses for PCB were made in 1987. **Polychlorinated Biphenyl** was not found, even at trace levels in any water supply included in the program.

#### Polynuclear Aromatic Hydrocarbons (PAH)

PAH occur widely in the environment and have been detected in water supplies. Reliable, routine laboratory methodologies have only recently been developed for the detection (at the required level of reliability) of **polynuclear aromatic hydrocarbons (PAH)** in drinking water. These compounds were added to the list of analytes for the DWSP during 1987. According to the World Health Organization (Guidelines for Drinking Water Quality, vol 1 Recommendations WHO Geneva 1984) levels of PAH in groundwater of 50 ng/L and in relatively unpolluted river water of 50-250 ng/L would not be unusual. PAH may be present in the coal-tar based pipe linings and coatings used on the interior of water pipes and to coat the inside of storage tanks and reservoirs.

Only the raw and treated waters at the plant were tested for the presence of PAH, a total of 2006 analyses were completed on treated waters.

**Benzo-K-fluoranthene, fluoranthene and pyrene** were all found in the Strange Street Reservoir supply of KITCHENER on two occasions. Benzo-K-fluoranthene was found at 1 ng/L twice, fluoranthene was found at 20 ng/L and 30 ng/L and pyrene was found at 40 ng/L twice. Fluoranthene was found twice in the treated water at BAYSIDE SCHOOL, subsequent development and confirmation of detection limits according to standard analytical protocol showed that the levels found were at or below the detection limit. The US EPA has set an AWQ guideline for fluoranthene of 42000 ng/L, but applicable guidelines are not available for the other compounds.

There is a close association in the environment between PAH and suspended solids; it is therefore felt that the application of treatment, when necessary, to achieve the recommended level of turbidity, will ensure that minimal PAH levels are obtained in finished waters.

## Phenolics

Although these compounds are organic in nature, they are not measured by routine organic analytical methods and have not been included in Table XII. A total of 373 analyses were carried out in treated water for phenolic compounds. There were only fifteen positive results found at several water supply locations.

Phenolic compounds occur in surface and other waters as a result of natural or industrial processes.

## Volatiles

Twenty eight volatile compounds, including the trihalomethanes are analysed for on DWSP. A total of 26413 analyses were carried out on treated water during 1987.

**Trihalomethanes (THMs)** are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs comprise mainly chloroform, chlorodibromomethane and dichlorobromomethane with bromoform occurring occasionally. The level of THMs found in water supplies is in part determined by the characteristics of the source waters.

In general, groundwaters produced the lowest levels of these compounds when chlorinated and river sources the highest; for most supplies on the Great Lakes, total THM levels were well below 100 ug/L. The ODWO of 350 ug/L for total THM was not exceeded at any supply, with the exception of one distribution system sample from the BRANTFORD supply, which was reported at 356.3 ug/L, marginally above the objective.

Of 21708 analyses for other volatile compounds in treated waters eight compounds were found yielding a total of only forty-nine positive results.

The other volatile compounds found above trace levels were:

**1,1-Dichloroethane** was found in one sample from a distribution system site on the BRANTFORD supply, at a level of 1 ug/L; there is no drinking water guideline for this substance.

**1,1,1-Trichloroethane** was found once at two supply locations: 1 ug/L at DOAN'S HOLLOW and 0.7 ug/L at ELGIN/ST THOMAS in the treated water. It was detected twice at the R.L.CLARK treatment plant in TORONTO in a distribution system site sample at 0.3 ug/L and 1.4 ug/L. At the Strange Street reservoir in KITCHENER it was detected eight times in the treated water, seven times at 2.0 ug/L and once at 4.8 ug/L.

There is no ODWO or Canadian Drinking Water Guideline for this substance, but the US EPA has set a Maximum Contaminant Level (MCL) of 200 ug/L for drinking water.

**Tetrachloroethylene** was found at quantifiable levels at WALLACEBURG, 0.6 ug/L in a distribution system site sample and at WINDSOR, 0.5 ug/L in the treated water at the plant.

There is no ODWO or Canadian Drinking Water Guideline for this substance. The World Health Organization has recommended a guideline value of 10 ug/L for drinking water.

There are several volatile substances which were typically found on an occasional basis at all the water supplies on the DWSP, usually at trace levels. These are **benzene**, **ethylbenzene**, **xylene**s and **toluene**.

**Benzene** was found at the ELGIN ST. THOMAS supply in a single distribution system site sample at 1.2 ug/L, at SOUTH PEEL (LAKEVIEW) in two distribution site samples at 2.3 ug/L and 0.6 ug/L and at the RAMSEY LAKE supply at SUDBURY at 0.65 ug/L, in a distribution site sample. The Canadian Drinking Water guideline for benzene is 5 ug/L.

**Ethylbenzene** appeared once at a quantifiable level only in the WINDSOR supply at 0.6 ug/L in a distribution system site sample; the Canadian Drinking Water Guidelines contain an aesthetic objective for this substance of 2.4 ug/L.

The **xylene**s occurred at three water supply systems. Meta- and Para-xylene are measured as one compound **Meta-xylene** and occurred at PORT DOVER twice in the treated water at 1.2 ug/L and 0.5 ug/L and once in a distribution system site sample at 0.6 ug/L. SOUTH PEEL (LAKEVIEW) recorded 0.3 ug/L once in the treated water and 0.2 ug/L twice in two distribution system site samples. The WINDSOR water supply had one positive result of 1.6 ug/L at a distribution system site. **Ortho-xylene** appeared once in the treated water at the PORT DOVER supply at 0.6 ug/L and once in a distribution system sample at WINDSOR at 0.6 ug/L.

The Canadian Drinking Water Guidelines provide an aesthetic objective for Total Xylenes of 300 ug/L.

**Toluene** appeared the most frequently of the volatiles above trace levels. Levels of 2.0 ug/L and 1.0 ug/L were detected in two distribution site samples in BRANTFORD, 0.55 ug/L was detected in one distribution site sample at CORNWALL and 0.6 ug/L was detected in one distribution site sample at PETERBOROUGH. Toluene was detected fourteen times at PORT DOVER, seven times in the treated water with levels ranging from 0.5 ug/L to 1.6 ug/L, five times at one distribution site ranging from 0.5 ug/L to 1.1 ug/L and twice at the other distribution site at 0.65 ug/L and 1.0 ug/L. It was detected at 0.95 ug/L in a single distribution site sample at ST. CATHARINES. In addition it was detected once in the treated water at the LEMIEUX ISLAND (OTTAWA) plant at 0.7 ug/L.

The Canadian Drinking Water Guidelines provide an aesthetic objective of 24 ug/L for toluene.

ODWOs and/or Canadian Drinking Water Guidelines are not available for some of the volatile compounds detected: 1,1-dichloroethane, 1,1,1-trichloroethane and tetrachloroethylene. A request for health assessment of these compounds with a view to guideline development has been made to Health and Welfare, Canada.

The detection of these volatiles in water supplies at trace and quantifiable levels, most frequently in the treated waters, could indicate that they are produced by the treatment process or that the source of the contamination lies within the treatment plant itself; either in the treatment chemicals themselves or from the components or structures within the treatment plant or distribution system. Research is required to define the source.

#### Organic Substances Detected in Raw Water

A total of 30534 analyses for organic substances were performed on the raw waters. Aside from trihalomethanes and phenolics sixteen positives were detected (Table XII). While Drinking Water Guidelines are not applicable to raw water they are provided for comparison with the levels found.

**Pentachlorophenol** was detected once at the BAYSIDE SCHOOL water supply at 120 ng/L. The Canadian drinking water guideline is 60000 ng/L.

Recent development and confirmation of detection limits according to standard analytical protocol showed that the levels for the polynuclear aromatic hydrocarbons found at HAMILTON, BAYSIDE SCHOOL and UNION were at or below the detection limit with the exception of **benzo(k) fluoranthene** which was detected at 2 ng/L at UNION. According to the World Health Organization (Guidelines for Drinking Water Quality, vol 1 Recommendations WHO Geneva 1984) levels of PAH in groundwater of 50 ng/L and in relatively unpolluted river water of 50-250 ng/L would not be unusual.

**Atrazine** was detected once at ALVINSTON at 1720 ng/L and once at DRESDEN at 14400 ng/L. The Canadian interim maximum acceptable concentration (MAC) is 60000ng/L.

**Bladex** was detected once at DRESDEN at 3200 ng/L and once at HAMILTON at 5450 ng/L. The Canadian interim MAC is 10000 ng/L.

**Metolachlor** was detected once at DRESDEN at 9020 ng/L. The Canadian interim MAC is 50000 ng/L.

**Prometone** was detected once at HAMILTON at 1460 ng/L. The US Environmental Protection Agency's lifetime health advisory for prometone in drinking water is 52500 ng/L.

**Simazine** was detected once at HAMILTON at 860 ng/L. The Canadian interim MAC is 10000 ng/L.

**Toluene** was detected once at Port Dover at .70 ug/L. The Canadian aesthetic objective for toluene in drinking water is 24 ug/L.

## Additional Analyses

Once a year, samples are taken at each water supply system and analyzed by the Gas Chromatography/Mass Spectrometry (GC/MS) method for the presence of organic contaminants. Such analysis is designed to identify the presence of contaminants which are not included in the regular analysis scans but which may be present in the waters in significant concentrations. Results have not identified the presence of any unusual contaminants at any of the supplies.

These analyses are useful to confirm the presence and amount of the contaminants which are found during the regular scans. At this stage there is not enough expertise in chemical interpretation of the data (Senior Scientific Advisor, MOE personal communication) and computer identification is limited by the size of the reference library of standard spectra used in the method. Many of the "exotic" compounds identified by the computer are highly unstable in water and are unlikely to exist in the samples. Specifically these compounds are thought to be artifacts formed from volatile but thermally unstable larger molecules (such as chloramines) upon heating the trap to desorb the trapped organic compounds for gas chromatography and mass spectrometry. Other compounds are straight oxidation products of natural organic matter.

These data, although they are available if requested, have not been included on the DWSP database and have not been reported in the Annual reports, since little of significance has been found. However, the GC/MS scans will continue to be included in the DWSP to ensure that contaminants of concern not included in the routine analysis will be detected.

Overall, for laboratory and field chemistry and metals there appears to be little difference in quality between treated water at the plant and free flowing distributed water. At almost all locations however, results showed that metals (usually copper, iron and zinc and occasionally lead and cadmium) could be leached from the household plumbing as the water remained in the pipes overnight.

The levels of lead in the standing waters only exceeded the ODWO in Brantford, Burlington, the Lake Huron Supply, Ottawa (Lemiux Island) and Wallaceburg on one occasion, and at North Bay twice. However the ODWOs only apply to free flow waters. Further investigation of these situations would be prudent.

## OVERVIEW OF RESULTS AND DISCUSSION

A considerable amount of effort is involved in the sampling program, to attempt to capture the same block of water as it passes through the distribution system. The inability to predict the path taken by the distributed water, the presence of more than one source of water on the same distribution system and a lack of accurate information to calculate residence times makes

it difficult to determine the timing of the sampling; the elapsed time should be adjusted to allow for changes in water demand which result in higher flows and shorter residence times generally in the summer months. An arbitrary cut off time of 48 hours is used in any event according to DWSP protocols, at those systems where residence time is excessive. Phased sampling is difficult to coordinate and leads to some samples being received after their validity has expired.

Further, the results from some of the supplies show that the attempts appeared unsuccessful and the results are then difficult to interpret eg. pesticides occurring in a distribution system sample and not in the treated water. Consideration should be given to eliminating phased sampling in distribution systems, except where it is certain that the routing of distributed water can be accurately determined; this would mean elimination in most large complex and/or multisource systems. Phased sampling at the treatment plant, where residence times can be more accurately and readily determined, should be retained.

There were some results which indicated that improvements in specific plant processes were necessary. At many plants, aluminum residuals in the treated water exceeded the operational guideline given in the ODWO; fluoridation practice appeared to require modification at some plants to ensure the maintenance of the recommended levels in the distributed water. No health related guidelines, with the exception of Total Trihalomethanes which was exceeded in one distribution sample, for organic parameters were exceeded in any of the supplies. However, improvements in plant operational practices could lead to an increase in overall water quality.

The Water Plant Optimization Study (WPOS) currently underway will assess plant operational practice in depth and will provide recommendations for improvement where necessary. It will provide assistance to ensure that the dosages of treatment chemicals are optimized at all times and that the necessary chemicals are applied continuously. The WPOS emphasizes the optimal removal of particulate material (upon which many contaminants of concern may be adsorbed) and close control of the disinfection procedures.

Certain chloroaromatic substances, including hexachloroethane and the tetrachlorobenzenes tended to be found more frequently in the treated waters, usually at trace levels. This could be due to a reaction of chlorine with organics present in the raw water or in the distribution system.

As well, volatiles (benzene, toluene, the xylenes and ethylbenzene) are typically found on an occasional basis in treated water all water supplies, usually at trace levels. This could indicate a source of contamination within the treatment plants themselves or the distribution systems.

It is evident from the results that some substances may be found in treated drinking water for which ODWOs and/or Canadian Drinking Water Guidelines have not yet been set, for example the

trichlorotoluenes and hexachloroethane. While these compounds are found infrequently and at parts per trillion levels, a submission has been made through the Federal/Provincial Subcommittee on Drinking Water to Health and Welfare Canada for assessment of health effects and possible drinking water guideline development. Representatives from Health and Welfare Canada have indicated that guideline level assessment is under way for the chlorobenzenes, hexachloroethane, 1,1,1-trichloroethane, and tetrachloroethylene. Insufficient toxicological information is felt exists for the assessment of the trichlorotoluenes. The Ministry of the Environment will solicit advice from appropriate agencies on the gathering of such information. The Ministry will also initiate the process of health assessment for 1,1-dichloroethane.

The list of parameters analyzed on the program is a dynamic one, with the provision being made for the inclusion of additional parameters of concern as they are identified and a reliable routine method for analysis is developed. The program saw the inclusion of analysis for the polyaromatic hydrocarbons to the list of analytes during 1987. A prioritization method for the identification of new compounds to be added is under development.

There is always an interest on the part of the public in comparing the "quality" of drinking water from various supplies. Historically, this kind of comparison has been based on such characteristics as taste, clarity and hardness. The amount of valid information available from the DWSP should enable a comparison to be made on more objective grounds, perhaps a "water quality index" incorporating several key measurements. Investigations into the possibility of developing such an index will be pursued.

#### SUMMARY and CONCLUSIONS

The water quality produced by all of the water supply systems on the DWSP for 1987 was good.

Coliforms and/or fecal coliforms were isolated occasionally in the water from the treatment plant and the distribution system of a few supplies. The DWSP, because of its sampling frequency, is not designed to evaluate all aspects of the bacteriological quality of the water; this can only be accomplished by referring to the results of the routine bacteriological monitoring carried out by the operating authority.

Most supplies exceeded the aesthetic ODWOs for organic nitrogen and temperature and some exceeded the ODWO for colour. The operational guideline for residual aluminum was exceeded at least occasionally in most distributed waters.

Recommended levels of fluoride were not maintained in all of the supplies distribution water, as measured by the DWSP.

of treated water at a treatment plant; levels in the distributed water were normal and resampling did not confirm its continued presence. No other health related ODWOs for metals were exceeded.

The health-related ODWO for nitrate was exceeded in only one sample of distributed water in a supply from a predominantly agricultural area; subsequent samples were below the maximum acceptable concentration.

The health related ODWO for turbidity was exceeded occasionally at a few supplies although discrepancies between plant, field and laboratory measurements render interpretations difficult. The limit applies only to treated water leaving the plant, and is important because of the ability of particulate matter to interfere with the process of disinfection. The limited bacteriological analysis from DWSP did not indicate any interference.

The ODWO for total THMs was exceeded in only one sample of distributed water. Some other organic substances, including pesticides were found at quantifiable levels. No other health-related guidelines for organic substances were exceeded.

#### RECOMMENDATIONS

The recommendations can be divided into four categories:

- plant operational practise
- adjustments to the DWSP
- necessary research
- other

##### 1. Plant Operational Practise

- i) Operating authorities should recognize that increases of temperature in distributed water will probably occur in the warmer months of the year. To control bacterial growths and the associated problems, close attention should be paid to the chlorine residuals leaving the plant during these periods, to ensure they are sufficient to prevent bacteriological deterioration.
- ii) Since the "plant operating" and "field chemistry" data obtained form an integral part of the DWSP database, and are of great importance in assessing and interpreting analytical results, operating personnel are urged to ensure that all figures are fully and correctly entered on both the "sample day conditions" and the "field chemistry" submission sheets.

- iii) Fluoridation practise may require modification at some plants to ensure that the recommended levels of fluoride are maintained in the distributed water.
- iv) In order to ensure the consumer of the highest quality of water, treatment chemicals appropriate to the supply should be added at all times.
- v) At most treatment plants where alum is used as a primary coagulant, the recommended guideline level (ODWO revised 1983) for residual alum in water entering the distribution system was exceeded. Operating authorities should investigate the reasons for this and implement corrective action where possible.

## 2. Adjustments to the DWSP

- i) Consideration should be given to eliminating the phased sampling in the distribution systems of large and/or multiple source systems, while maintaining phased sampling for the raw and treated water samples at the plant.
- ii) Consideration should be given to eliminating analysis for cyanide, mercury and pesticides in the distributed water.
- iii) A prioritization method for identification of new compounds to be added to the list of parameters analyzed should be finalized.
- iv) The importance of completing health assessments for compounds identified by DWSP , and developing drinking water guidelines, should be emphasized and transmitted to the Federal/Provincial Sub-Committee on Drinking Water.
- v) The database for each water supply location should be reviewed in consultation with Regional, plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analyzed should be altered.
- vi) DWSP personnel should investigate the possibility of developing a "water quality index", based on several key parameter measurements, to enable the comparison of the quality between the various water supplies on the system.

## 3. Necessary Research

- i) There is evidence from the results that certain chloroaromatic substances may be produced by the action of chlorine on organic substances in the water or within the distribution system (or possibly are contaminants of the chlorine itself); studies should be undertaken to determine the reason for their occurrence.

- ii) The DWSP has shown that some volatile substances appear in the treated waters at trace levels, these include benzene, toluene, the xylenes and ethylbenzene. An investigation of the source of these compounds, which appears to be within the treatment plant should be carried out.
- iii) The reasons for the discrepancies between laboratory and field determinations of turbidity and fluoride concentrations need to be determined.
- iv) Investigation should be undertaken into the deterioration of the preservative used in samples for mercury analysis.

#### 4. Other

- i) The aesthetic objective for organic nitrogen should be considered for modification/deletion when the ODWOs are reviewed.

TABLE I

1987 DRINKING WATER SURVEILLANCE PROGRAM

WATER SUPPLY

ALVINSTON WTP  
 AMHERSTBURG WSS  
 BAYSIDE SCHOOL WTP  
 BELLEVILLE WTP  
 BRANTFORD WTP  
 BURLINGTON WSS  
 CORNWALL WTP  
 DESERONTO WTP  
 DRESDEN WTP  
 ELGIN (ST THOMAS) WSS  
 FORT ERIE (ROSEHILL WTP)  
 GRIMSBY WTP  
 HAMILTON WSS  
 HARROW-COLCHESTER SOUTH WSS  
 KINGSTON WTP  
 KITCHENER (RECHARGE WELL, STRANGE STREET RESERVOIR,  
 WELL SUPPLY)  
 LONDON (LAKE HURON WSS)  
 MITCHELLS BAY WTP  
 NIAGARA FALLS WTP  
 NORTH BAY WTP  
 OSHAWA WSS  
 OTTAWA WSS (BRITANNIA)  
 OTTAWA WSS (LEMIEUX ISLAND)  
 PETERBOROUGH WSS  
 PORT DOVER (WATER SUPPLY AND DOAN'S HOLLOW  
 INFILTRATION POND)  
 PORT STANLEY WTP  
 ST CATHARINES (DE CEW WSS)  
 SARNIA (LAMBTON COUNTY WTP)  
 SAULT STE MARIE (LORNA WELL, STEELTON WELL, WTP)  
 SOUTH PEEL (LAKEVIEW) WSS  
 SOUTH PEEL (LORNE PARK) WSS  
 STOUFFVILLE (RAW WELL 5, RAW WELL 6, WELL SUPPLY)  
 SUDBURY (DAVID ST WTP)  
 SUDBURY (WANAPITEI WSS)  
 TILBURY NORTH WSS (STONE POINT)  
 TORONTO (EASTERLY WTP)  
 TORONTO (R. C. HARRIS WTP)  
 TORONTO (R. L. CLARK WTP)  
 UNION WSS  
 WALLACEBURG WTP  
 WALPOLE ISLAND WTP  
 WINDSOR WSS

## KEY TO TABLE II

- A      ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
  - 1+. MAC for Total Trihalomethanes
  - 1\*. MAC for Bacteriological Analyses
- Poor water quality is indicated when :
- total coliform counts > 0 < 5
  - P/A Bottle Test is present after 48 hours
  - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
  - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
  - Standard Plate Count should not exceed 500 organisms per ml at 35 °C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
  3. Maximum Desirable Concentration (MDC)
  4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B      HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
  2. Proposed MAC
  3. Interim MAC
  4. Aesthetic Objective (AO) (for xylenes, the AO is a total)
- C      WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
  2. Tentative GV
  3. Aesthetic GV
- D      US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
  2. Suggested No-Adverse Effect Level (SNAEL)
  3. Lifetime Health Advisory
  4. EPA Ambient Water Quality Criteria
- F      EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
  2. Aesthetic Guideline Level
  3. Maximum Admissable Concentration (MADC)
- G      CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- H      USSR MAXIMUM PERMISSIBLE CONCENTRATION
- I      NEW YORK STATE AMBIENT WATER GUIDELINE
- N/A    NONE AVAILABLE

TABLE II

DRINKING WATER SURVEILLANCE PROGRAM

<u>SCAN/PARAMETER</u>	<u>UNIT</u>	<u>DETECTION LIMIT</u>	<u>GUIDELINE</u>
<b>BACTERIOLOGICAL</b>			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML (A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL (A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
<b>CHLOROAROMATICS</b>			
HEXACHLOROBUTADIENE	NG/L	1.000	450 (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROETHANE	NG/L	1.000	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
<b>CHLOROPHENOLS</b>			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000 (B1)
PENTACHLOROPHENOL	NG/L	50.	60000 (B1)
<b>CHEMISTRY (FLD)</b>			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	°C	N/A	<15 °C (A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
<b>CHEMISTRY (LAB)</b>			
ALKALINITY	MG/L	.200	30-500 (A4)
CALCIUM	MG/L	.100	100 (F2)
CYANIDE	MG/L	.001	.200 (A1)
CHLORIDE	MG/L	.200	250 (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400 (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100 (A4)
MAGNESIUM	MG/L	.05	30 (F2)
SODIUM	MG/L	.20	200 (C3)
AMMONIUM TOTAL	MG/L	.002	.05 (F2)
NITRITE	MG/L	.001	1.0 (A1)

<u>SCAN/PARAMETER</u>	<u>UNIT</u>	<u>DETECTION</u> <u>LIMIT</u>	<u>GUIDELINE</u>	
TOTAL NITRATES	MG/L	.02	10.	(A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A	
PH	DMSNLESS	N/A	6.5-8.5	(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A	
PHOSPHORUS TOTAL	MG/L	.002	.40	(F2)
TOTAL SOLIDS	MG/L	1.	500	(A3)
TURBIDITY	FTU	.02	1.0	(A1)
METALS				
ALUMINUM	MG/L	.004	.10	(A4)
ARSENIC	MG/L	.001	.05	(A1)
BARIUM	MG/L	.001	1.0	(A1)
BORON	MG/L	.01	5.0	(A1)
BERYLLIUM	MG/L	.001	.0002	(H)
CADMIUM	UG/L	.30	5.0	(A1)
COBALT	MG/L	.001	1.0	(H)
CHROMIUM	UG/L	.001	.05	(A1)
COPPER	MG/L	.001	1.0	(A3)
IRON	MG/L	.002	.300	(A3)
MERCURY	UG/L	.01	1.0	(A1)
MANGANESE	MG/L	.001	.05	(A3)
MOLYBDENUM	MG/L	.001	.50	(H)
NICKEL	MG/L	.001	.05	(F3)
LEAD	MG/L	.003	.05	(A1)
SELENIUM	MG/L	.001	.01	(A1)
STRONTIUM	MG/L	.001	2.0	(H)
URANIUM	UG/L	.02	20.	(A2)
VANADIUM	MG/L	.001	.10	(H)
ZINC	MG/L	.001	5.0	(A3)
PHENOLICS				
PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0	(A3)
PESTICIDES & PCB				
ALDRIN	NG/L	1.0	700	(A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700	(G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300	(G)
GAMMA HEXACHLOROCYCLOHEXANE (LINDANE)	NG/L	1.0	4000	(A1)
ALPHA CHLORDANE	NG/L	2.0	7000	(A1)
GAMMA CHLORDANE	NG/L	2.0	7000	(A1)
DIELDRIN	NG/L	2.0	700	(A1)
METHOXYCHLOR	NG/L	5.0	100000.	(A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000	(D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000	(D4)
ENDRIN	NG/L	4.0	200	(A1)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	4.0	N/A	
HEPTACHLOR EPOXIDE	NG/L	1.0	3000	(A1)
HEPTACHLOR	NG/L	1.0	3000	(A1)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O, P-DDT	NG/L	5.0	30000	(A1)

<u>SCAN/PARAMETER</u>	<u>UNIT</u>	<u>DETECTION</u>	
		<u>LIMIT</u>	<u>GUIDELINE</u>
PCB	NG/L	20.0	3000 (A2)
O, P-DDD	NG/L	5.0	N/A
PPDDE	NG/L	1.0	30000 (A1)
PPDDT	NG/L	5.0	30000 (A1)
ATRATONE	NG/L	50.	N/A
ALACHLOR	NG/L	500.	35000 (D2)
ETHYLENE DIBROMIDE	UG/L	.050	50. (G)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)

#### POLYAROMATIC HYDROCARBONS

PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO (A) ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO (A) ANTHRACENE	NG/L	5.0	N/A	
BENZO (E) PYRENE	NG/L	50.0	N/A	
BENZO (B) FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO (K) FLUORANTHENE	NG/L	1.0	N/A	
BENZO (A) PYRENE	NG/L	5.0	10.0	(B1)
BENZO (G, H, I) PERYLENE	NG/L	20.0	N/A	
DIBENZO (A, H) ANTHRACENE	NG/L	10.0	N/A	
INDENO (1, 2, 3-C, D) PYRENE	NG/L	20.0	N/A	
BENZO (B) CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	

#### SPECIFIC PESTICIDES

TOXAPHENE	NG/L	N/A	5000	(A1)
AMETRINE	NG/L	50.	300000	(D3)
ATRAZINE	NG/L	50.	60000	(B3)
BLADEx	NG/L	100.	10000	(B3)
PROMETONE	NG/L	50.	52500	(D3)
PROPazine	NG/L	50.	16000	(D2)
PROMETRYNE	NG/L	50.	1000	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000	(B2)
SIMAZINE	NG/L	50.	10000	(B3)
2, 4, 5-TRICHLOROBUTYRIC ACID (2, 4, 5-T)	NG/L	50.	280000	(B1)
2, 4-DICHLOROBUTYRIC ACID (2, 4-D)	NG/L	100.	100000	(A1)
2, 4-DICHLOROPHENOXYBUTYRIC ACID	NG/L	200.	18000	(B3)
2, 4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	87000	(B3)
PICHLORAM	NG/L	100.	2450000	(D3)
SILVEX (2, 4, 5-TP)	NG/L	50.	10000	(A1)
DIAZINON	NG/L	20.	14000	(A1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000	(G)
GUTHION	NG/L	N/A	N/A	
MALATHION	NG/L	20.	160000	(G)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000	(B3)

<u>SCAN/PARAMETER</u>	<u>UNIT</u>	<u>DETECTION LIMIT</u>	<u>GUIDELINE</u>	
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	35000	(B1)
PHORATE (THIMET)	NG/L	20.	35.0	(D2)
RELDAN	NG/L	20.	N/A	
RONNEL	NG/L	20.	N/A	
AMINOCARB	NG/L	N/A	N/A	
BENONYL	NG/L	N/A	N/A	
BUX (METALKAMATE)	NG/L	2000.	N/A	
CARBOFURAN	NG/L	2000.	18000	(D3)
CICP (CHLORPROPHAM)	NG/L	2000.	350000	(G)
DIALATE	NG/L	2000.	30000	(H)
EPTAM	NG/L	2000.	N/A	
IPC	NG/L	2000.	N/A	
PROPOXUR (BAYGON)	NG/L	2000.	90000	(G)
SEVIN (CARBARYL)	NG/L	200.	70000	(A1)
SUTAN (BUTYLATE)	NG/L	2000.	245000	(D3)
METOLACHLOR	NG/L	500.	50000	(B3)
VOLATILES				
BENZENE	UG/L	.050	5.0	(B1)
TOLUENE	UG/L	.050	24.0	(B4)
ETHYLBENZENE	UG/L	.050	2.4	(B4)
PARA-XYLENE	UG/L	.100	300	(B4)
META-XYLENE	UG/L	.100	300	(B4)
ORTHO-XYLENE	UG/L	.050	300	(B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0	(D1)
METHYLENE CHLORIDE	UG/L	.500	1750	(D3)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	350	(D3)
1,1-DICHLOROETHANE	UG/L	.100	N/A	
CHLOROFORM	UG/L	.100	350	(A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200	(D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0	(D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0	(D1)
1,2-DICHLOROPROPANE	UG/L	.050	10.0	(G)
TRICHLOROETHYLENE	UG/L	.100	5.0	(D1)
DICHLOROBROMOMETHANE	UG/L	.050	350	(A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60	(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350	(A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0	(C2)
BROMOFORM	UG/L	.200	350	(A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17	(D4)
CHLOROBENZENE	UG/L	.100	1510	(D3)
1,4-DICHLOROBENZENE	UG/L	.100	5.0	(B1)
1,3-DICHLOROBENZENE	UG/L	.100	130	(G)
1,2-DICHLOROBENZENE	UG/L	.050	200	(B1)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A	
TOTAL TRIHALOMETHANES	UG/L	.500	350	(A1)
STYRENE	UG/L	.05	46.5	(D2)

TABLE III  
DRINKING WATER SURVEILLANCE PROGRAM

SUMMARY TABLE BY SCAN 1987

SCAN	RAW		TREATED		SITE 1		SITE 2		TOTAL	
	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE
BACTERIOLOGICAL	1311	1070	1511	380	1112	276	1218	347	5152	2073
CHEMISTRY (FLD)	1018	1017	2045	2045	2794	2794	2922	2922	8779	8778
CHEMISTRY (LAB)	6723	5471	6899	4954	8995	7689	9666	8130	32283	26244
METALS	7152	3694	7355	3465	10540	5568	11387	6018	36434	18745
CHLOROAROMATICS	4420	0	4628	5	3340	5	3731	7	16119	17
CHLOROPHENOLS	468	1	456	0	.	.	.	.	924	1
PAH	2040	7	2006	8	.	.	.	.	4046	15
PESTICIDES&PCB	8471	0	8851	1	6420	1	7139	1	30881	3
PHENOLICS	345	20	355	15	7	0	11	0	718	35
SPECIFIC PESTICIDES	5164	7	5206	4	2382	2	2608	1	15360	14
VOLATILES	9626	51	10269	1312	7858	1049	8286	1117	36039	3529
TOTAL	46738	11338	49581	12189	43448	17384	46968	18543	186735	59454

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT  
OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

TABLE IV

DRINKING WATER SURVEILLANCE PROGRAM

1987 EXCEEDENCES OF STANDARD PLATE COUNT IN TREATED WATERS

PLANT	TREATED		SITE 1		SITE 2		TOTAL	
	#TESTS	EXCEEDENCE	#TESTS	EXCEEDENCE	#TESTS	EXCEEDENCE	#TESTS	EXCEEDENCE
ALVINSTON WTP	1	1	.	.	.	.	1	1
BELLEVILLE WTP	8	1	8	0	9	0	25	1
BRANTFORD WTP	1	0	9	3	9	5	19	8
CORNWALL WTP	4	0	6	1	7	4	17	5
DAVID ST WTP	.	.	2	0	6	1	8	1
DE CEW WSS	7	1	9	1	9	1	25	3
EASTERLY WTP	12	1	6	0	6	0	24	1
NIAGARA FALLS WTP	12	3	10	0	20	2	42	5
NORTH BAY WTP	.	.	4	1	6	0	10	1
OTTAWA (BRITANNIA)	12	0	12	1	11	2	35	3
OTTAWA (LEMIEUX)	12	0	12	1	10	1	34	2
PORT DOVER WSS	9	1	9	1	6	0	24	2
ROSEHILL WTP	6	0	9	1	5	1	20	2
LORNA WELL	9	3	.	.	.	.	9	3
STEELTON WELL	9	1	.	.	.	.	9	1
SAULT STE MARIE WTP	9	0	8	4	8	0	25	4
WALLACEBURG WTP	10	0	8	1	7	1	25	2
WANAPITEI WSS	.	.	4	0	3	1	7	1
WINDSOR WSS	10	1	8	1	8	1	26	3
TOTAL	131	13	124	16	130	20	385	49

\* The limit for Standard Plate Count (35°C, 48 hours) is 500 organisms/mL based on a geometric mean of 5 or more samples.

TABLE V

FLUORIDE IN TREATED WATERS

PLANT	<u>TREATED</u>		<u>SITE1</u>		<u>SITE2</u>		<u>TOTAL</u>	
	#TESTS	NOT IN RANGE	#TESTS	NOT IN RANGE	#TESTS	NOT IN RANGE	#TESTS	NOT IN RANGE
AMHERSTBURG WSS	2	2	.	.	.	.	2	2
BRANTFORD WTP	1	1	10	5	10	3	21	9
BURLINGTON WSS	12	10	8	7	12	10	32	27
CORNWALL WTP	4	0	9	4	9	4	22	8
EASTERLY WTP	12	2	6	0	6	0	24	2
ELGIN WSS	10	2	9	2	10	0	29	4
HAMILTON WSS	10	9	11	9	12	10	33	28
LAKE HURON WSS	23	12	8	8	8	5	39	25
OSHAWA WSS	8	2	9	6	11	4	28	12
OTTAWA (BRITANNIA)	12	12	11	11	12	12	35	35
OTTAWA (LEMIEUX ISLAND)	12	12	12	11	12	11	36	34
PETERBOROUGH WSS	8	5	13	4	11	5	32	14
PORT STANLEY WTP	2	2	.	.	.	.	2	2
R. C. HARRIS WTP	9	3	4	0	5	0	18	3
R. L. CLARK WTP	12	2	5	0	6	0	23	2
(SARNIA) LAMBTON COUNTY	11	6	9	4	9	4	29	14
SOUTH PEEL (LAKEVIEW)	12	3	12	4	31	14	55	21
SOUTH PEEL (LORNE PARK)	2	1	.	.	.	.	2	1
SUDBURY (DAVID ST)	.	.	5	3	9	5	14	8
SUDBURY (WANAPITEI)	.	.	7	2	7	1	14	3
WALLACEBURG WTP	13	8	12	7	10	6	35	21
WINDSOR WSS	12	0	12	1	12	1	36	2
TOTAL	187	94	172	88	202	95	561	277

THE RECOMMENDED LEVEL (1-1.4 mg/L) WAS NOT MAINTAINED IN 22 OF THE 24 SUPPLIES THAT FLUORIDATE

TABLE VI

DRINKING WATER SURVEILLANCE PROGRAM

1987 TURBIDITY EXCEEDENCES IN TREATED WATER LEAVING THE PLANT

PLANT	TURBIDITY >1.0 IN TREATED WATER
ALVINSTON WTP	1
ELGIN WSS	1
LONDON (LAKE HURON WSS)	1
SARNIA (LAMBTON COUNTY WTP)	2
OSHAWA WSS	1
OTTAWA WSS (BRITANNIA)	2
OTTAWA WSS (LEMIEUX ISLAND)	1
WINDSOR WSS	1

TABLE VII  
DRINKING WATER SURVEILLANCE PROGRAM

ORGANIC NITROGEN VALUES FOR 1987

<u>PLANT</u>	<u>EXCEEDENCES OF ODWO OF .15 mg/L</u>	<u>#TESTS</u>
ALVINSTON WTP	1	1
AMHERSTBURG WSS	0	2
BAYSIDE SCHOOL WTP	6	6
BELLEVILLE WTP	26	28
BRANTFORD WTP	20	21
BURLINGTON WSS	13	32
CORNWALL WTP	15	22
DESERONTO WTP	12	12
DRESDEN WTP	2	2
EASTERLY WTP	15	24
ELGIN WSS	4	30
FORT ERIE WTP	10	20
GRIMSBY WTP	9	20
HAMILTON WSS	20	35
HARROW-COLCHESTER SOUTH WSS	0	2
KINGSTON WTP	11	36
KITCHENER (RECHARGE WELL)	10	10
KITCHENER(STRANGE STREET RESERVOIR)	0	8
KITCHENER WELL SUPPLY	1	11
LAKE HURON WSS	1	41
MITCHELLS BAY WTP	0	2
NIAGARA FALLS WTP	13	43
NORTH BAY WTP	10	18
OSHAWA WSS	15	28
OTTAWA WSS (BRITANNIA)	7	36
OTTAWA WSS (LEMIEUX ISLAND)	8	36
PETERBOROUGH WSS	32	32
PORT DOVER WSS	7	28
DOANS HOLLOW SPRING SUPPLY	0	8
PORT STANLEY WTP	1	2
R. C. HARRIS WTP	11	19
R. L. CLARK WTP	13	23
(SARNIA) LAMBTON COUNTY WTP	1	29
SAULT STE MARIE (LORNA WELL)	0	9
SAULT STE MARIE WTP	1	26
SOUTH PEEL (LAKEVIEW) WSS	27	56
SOUTH PEEL (LORNE PARK) WSS	2	2
ST CATHARINES WSS	12	30
STOUFFVILLE WELL SUPPLY	0	7
STONEY POINT WSS	0	2
SUDBURY (DAVID ST) WTP	13	14
SUDBURY (WANAPITEI) WTP	4	14
UNION WSS	0	30
WALLACEBURG WTP	1	38
WALPOLE ISLAND WTP	1	9
WINDSOR WSS	2	37

REPORTED FOR TREATED WATER AND FREE FLOW DISTRIBUTION WATER ONLY.

TABLE VIII

DRINKING WATER SURVEILLANCE PROGRAM

1987 EXCEEDENCES OF 5.0 FTU FOR COLOUR IN TREATED WATERS

PLANT	TREATED		SITE 1		SITE 2		TOTAL	
	#TESTS	#EXCEED	#TESTS	#EXCEED	#TESTS	#EXCEED	#TESTS	#EXCEED
BELLEVILLE WTP	9	0	9	2	10	0	28	2
BRANTFORD WTP	1	1	10	5	10	5	21	11
CORNWALL WTP	4	0	9	1	9	0	22	1
DAVID ST WTP	.	.	5	2	9	7	14	9
DESERONTO WTP	6	1	6	0	.	.	12	1
DRESDEN WTP	2	2	.	.	.	.	2	2
EASTERLY WTP	12	0	6	2	6	0	24	2
KINGSTON WTP	12	0	11	0	12	1	35	1
KITCHENER (RECHARGE WELL)	10	1	.	.	.	.	10	1
NIAGARA FALLS WTP	12	0	11	1	20	0	43	1
NORTH BAY WTP	.	.	9	7	8	6	17	13
LEMIEUX ISLAND	12	1	12	0	12	0	36	1
PETERBOROUGH WSS	8	0	13	6	11	6	32	12
R.C. HARRIS WTP	9	0	4	0	5	4	18	4
ROSEHILL WTP	6	0	9	0	5	2	20	2
SAULT STE MARIE WTP	9	0	9	0	8	1	26	1
LAKEVIEW WSS	12	0	11	7	31	0	54	7
WALLACEBURG WTP	14	0	12	0	11	1	37	1
WANAPITEI WSS	.	.	7	5	7	0	14	5
TOTAL	138	6	153	38	174	33	465	77

TABLE IX

DRINKING WATER SURVEILLANCE PROGRAM

## 1987 EXCEEDENCES OF TEMPERATURE IN TREATED WATERS

PLANT (#over 15°C/ total)	TREATED	SITE 1	SITE 2	TOTAL
ALVINSTON WTP	1/1	.	.	1/1
AMHERSTBURG WSS	1/2	.	.	1/2
BAYSIDE SCHOOL WTP	2/6	.	.	2/6
BELLEVILLE WTP	5/9	7/8	5/10	17/27
BRANTFORD WTP	0/1	5/10	5/10	10/21
BURLINGTON WSS	3/12	2/8	5/11	10/31
CORNWALL WTP	1/4	5/9	4/9	10/22
ST CATHARINES	4/8	5/11	5/11	14/30
DESERONTO WTP	1/6	1/6	.	2/12
DRESDEN WTP	1/2	.	.	1/2
EASTERLY WTP	2/12	4/6	2/6	8/24
ELGIN WSS	4/10	4/10	4/10	12/30
FORT ERIE WTP	3/6	5/9	3/5	11/20
GRIMSBY WTP	3/9	4/11		7/20
HAMILTON WSS	3/12	4/11	4/12	11/35
HARROW-COLCHESTER	1/2	.	.	1/2
KINGSTON WTP	3/12	4/10	4/12	11/34
KITCHENER WELL	3/10	.	.	3/10
LAKE HURON WSS	7/22	2/7	1/8	10/37
LAKEVIEW WSS	3/12	3/12	8/32	14/56
MITCHELLS BAY WTP	2/2	.	.	2/2
NIAGARA FALLS WTP	4/12	3/11	6/20	13/43
NORTH BAY WTP	.	0/8	1/9	1/17
OSHAWA WSS	2/8	3/9	2/11	7/28
OTTAWA (BRITANNIA)	4/12	4/12	5/11	13/35
OTTAWA (LEMIEUX)	4/12	4/12	5/12	13/36
PETERBOROUGH WSS	5/8	4/13	2/11	11/32
PORT DOVER WSS	4/10	4/10	2/6	10/26
R.C. HARRIS WTP	1/10	2/4	4/5	7/19
R.L. CLARK WTP	2/12	2/5	2/5	6/22
(SARNIA) LAMBTON COUNTY	1/10	3/9	1/9	5/28
SAULT STE MARIE	2/9	3/9	2/8	7/26
STONE POINT	1/2	.	.	1/2
SUDBURY (WANAPITEI)	.	3/6	1/5	4/11
UNION WSS	5/10	6/9	6/9	17/28
WALLACEBURG WTP	4/14	5/12	5/12	14/38
WALPOLE ISLAND WTP	3/9	.	.	3/9
WINDSOR WSS	5/13	4/12	4/12	14/37
TOTAL	100/311	105/269	99/281	304/861

TABLE X

DRINKING WATER SURVEILLANCE PROGRAM

1987 EXCEEDENCES OF 0.3 mg/L FOR IRON IN TREATED WATERS

PLANT	TREATED		SITE 1		SITE 2		TOTAL	
	#TESTS	#EXCEED	#TESTS	#EXCEED	#TESTS	#EXCEED	#TESTS	#EXCEED
CORNWALL WTP	4	0	9	1	9	0	22	1
LAKE HURON WSS	23	1	8	0	8	0	39	1
BRITANNIA	12	1	12	0	12	0	36	1
LEMIEUX ISLAND	12	0	12	0	12	1	36	1
R.C. HARRIS WTP	10	0	4	0	5	1	19	1
LAKEVIEW WSS	12	0	12	6	32	1	56	7
WINDSOR WSS	13	0	12	1	12	0	37	1
TOTAL	86	2	69	8	90	3	245	13

TABLE XI

DRINKING WATER SURVEILLANCE PROGRAM

1987 EXCEEDENCES OF PLANT OPERATIONAL GUIDELINE FOR ALUMINUM

PLANT	#TESTS	#OVER GUIDELINE
BAYSIDE SCHOOL WTP	6	4
BELLEVILLE WTP	9	7
BURLINGTON WSS	12	2
DRESDEN WTP	2	1
EASTERLY WTP	11	2
ELGIN WSS	10	3
FORT ERIE WTP	5	5
GRIMSBY WTP	7	3
HAMILTON WSS	11	6
KINGSTON WTP	12	3
LAKE HURON WSS	11	5
LAMBTON COUNTY WTP	11	3
NIAGARA FALLS WTP	12	6
OSHAWA WSS	8	4
OTTAWA WSS (BRITANNIA)	12	4
OTTAWA WSS (LEMIEUX ISLAND)	12	7
PETERBOROUGH WSS	8	8
PORT DOVER WSS	10	6
R. C. HARRIS WTP	10	5
R. L. CLARK WTP	12	4
SAULT STE MARIE WTP	9	6
SOUTH PEEL (LAKEVIEW) WSS	12	3
SOUTH PEEL (LORNE PARK) WSS	2	1
ST CATHARINES WTP	8	7
UNION WSS	9	3
WALLACEBURG WTP	14	1
WALPOLE ISLAND WTP	8	2
WINDSOR WSS	13	9
TOTAL	266	120

THE GUIDELINE (.10 mg/L) APPLIES ONLY TO WATER LEAVING THE PLANT

TABLE XII  
POSITIVE ORGANIC OCCURRENCES FOR 1987

PARAMETER -----	DATE ----	PLANT -----	SITE ----	RESULT -----
1,2,3,5-TETRACHLOROBENZENE	APR	BRANTFORD WTP	DISTRIBUTION	13.00 ng/L
		LAMBTON COUNTY WTP	TREATED	11.00 ng/L
1,2,4,5-TETRACHLOROBENZENE	JUN	AMHERSTBURG WSS	TREATED	36.00 ng/L
2,3,6-TRICHLOROTOLUENE	APR	BELLEVILLE WTP	DISTRIBUTION	56.00 ng/L
	AUG	PETERBOROUGH WSS	TREATED	51.00 ng/L
HEXACHLOROETHANE	MAR	BELLEVILLE WTP	DISTRIBUTION	12.00 ng/L
			DISTRIBUTION	14.00 ng/L
		KINGSTON WTP	DISTRIBUTION	12.00 ng/L
		NIAGARA FALLS WTP	TREATED	16.00 ng/L
			DISTRIBUTION	11.00 ng/L
			DISTRIBUTION	16.00 ng/L
		OTTAWA WSS		
		(LEMIEUX ISLAND)		
		UNION WSS	DISTRIBUTION	12.00 ng/L
			DISTRIBUTION	16.00 ng/L
	MAY	KINGSTON WTP	DISTRIBUTION	12.00 ng/L
		OTTAWA WSS	DISTRIBUTION	14.00 ng/L
		(LEMIEUX ISLAND)		
		PORT DOVER WSS	DISTRIBUTION	12.00 ng/L
	OCT	HAMILTON WSS	TREATED	15.00 ng/L
PENTACHLOROPHENOL	NOV	BAYSIDE SCHOOL WTP	RAW	120.00 ng/L
BENZO(A) PYRENE	OCT	HAMILTON WSS	RAW	5.00 ng/L
	DEC	HAMILTON WSS	RAW	5.00 ng/L
BENZO(B) FLUORANTHENE	OCT	UNION WSS	RAW	5.00 ng/L
BENZO(K) FLUORANTHENE	AUG	KITCHENER	TREATED	1.00 ng/L
		(STRANGE STREET)		
	OCT	KITCHENER	TREATED	1.00 ng/L
		(STRANGE STREET)		
		UNION WSS	RAW	2.00 ng/L
FLUORANTHENE	AUG	KITCHENER	TREATED	20.00 ng/L
		(STRANGE STREET)		
	OCT	KITCHENER	TREATED	30.00 ng/L
		(STRANGE STREET)		
		UNION WSS	RAW	10.00 ng/L
	NOV	BAYSIDE SCHOOL WTP	RAW	10.00 ng/L
			TREATED	10.00 ng/L
				10.00 ng/L
PHENANTHRENE	OCT	UNION WSS	RAW	10.00 ng/L
PYRENE	AUG	KITCHENER	TREATED	40.00 ng/L
		(STRANGE STREET)		

PARAMETER -----	DATE ----	PLANT -----	SITE ----	RESULT -----
PYRENE	OCT	KITCHENER (STRANGE STREET)	TREATED	40.00 ng/L
ATRATONE	JAN	LAMBTON COUNTY WTP	DISTRIBUTION	680.00 ng/L
ENDOSULFAN SULPHATE	APR	GRIMSBY WTP	TREATED	46.00 ng/L
LINDANE	AUG	BRANTFORD WTP	DISTRIBUTION	11.00 ng/L
ATRAZINE	JUN	ALVINSTON WTP	RAW	1720.0 ng/L
			TREATED	1700.0 ng/L
		BRANTFORD WTP	DISTRIBUTION	670.0 ng/L
		DRESDEN WTP	RAW	14400.0 ng/L
			TREATED	13900.0 ng/L
BLADEx	JAN	HAMILTON WSS	RAW	5450.0 ng/L
		LAMBTON COUNTY WTP	DISTRIBUTION	1800.0 ng/L
		PETERBOROUGH WSS	DISTRIBUTION	1140.0 ng/L
	JUN	DRESDEN WTP	RAW	3200.0 ng/L
			TREATED	3680.0 ng/L
METOLACHLOR	JUN	DRESDEN WTP	RAW	9020.0 ng/L
			TREATED	6650.0 ng/L
PROMETONE	JAN	HAMILTON WSS	RAW	1460.0 ng/L
SIMAZINE	JAN	HAMILTON WSS	RAW	860.0 ng/L
1,1-DICHLOROETHANE	APR	BRANTFORD WTP	DISTRIBUTION	1.00 ug/L
1,1,1-TRICHLOROETHANE	MAR	KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
		PORT DOVER	TREATED	2.00 ug/L
		SPRING SUPPLY	TREATED	1.00 ug/L
	APR	KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
	MAY	KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
	JUN	KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
	JUL	ELGIN WSS	TREATED	.70 ug/L
		KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
	AUG	KITCHENER (STRANGE STREET)	TREATED	2.00 ug/L
	OCT	KITCHENER (STRANGE STREET)	TREATED	4.80 ug/L
		R. L. CLARK WTP	DISTRIBUTION	.30 ug/L
	DEC	R. L. CLARK WTP	DISTRIBUTION	1.40 ug/L
BENZENE	NOV	DAVID ST WTP	DISTRIBUTION	.65 ug/L
		ELGIN WSS	DISTRIBUTION	1.20 ug/L
	DEC	SOUTH PEEL (LAKEVIEW)	DISTRIBUTION	2.30 ug/L
			DISTRIBUTION	.60 ug/L

PARAMETER -----	DATE ----	PLANT -----	SITE ----	RESULT -----
ETHYLBENZENE	JUN	WINDSOR WSS	DISTRIBUTION	.60 ug/L
M-XYLENE	JUN	PORT DOVER WSS	TREATED	1.20 ug/L
	JUL	PORT DOVER WSS	TREATED	.50 ug/L
			DISTRIBUTION	.60 ug/L
		SOUTH PEEL(LAKEVIEW)	TREATED	.30 ug/L
			DISTRIBUTION	.20 ug/L
				.20 ug/L
	OCT	WINDSOR WSS	DISTRIBUTION	1.60 ug/L
O-XYLENE	AUG	PORT DOVER WSS	TREATED	.60 ug/L
	OCT	WINDSOR WSS	DISTRIBUTION	.60 ug/L
TETRACHLOROETHYLENE	OCT	WALLACEBURG WTP	DISTRIBUTION	.60 ug/L
		WINDSOR WSS	TREATED	.50 ug/L
TOLUENE	APR	BRANTFORD WTP	DISTRIBUTION	2.00 ug/L
			DISTRIBUTION	1.00 ug/L
	MAY	PORT DOVER WSS	TREATED	.95 ug/L
			DISTRIBUTION	.50 ug/L
			DISTRIBUTION	.65 ug/L
	JUN	PORT DOVER WSS	TREATED	1.60 ug/L
			DISTRIBUTION	1.10 ug/L
			DISTRIBUTION	1.00 ug/L
	JUL	PORT DOVER WSS	TREATED	.90 ug/L
			DISTRIBUTION	1.10 ug/L
	AUG	PORT DOVER WSS	TREATED	.80 ug/L
			DISTRIBUTION	.90 ug/L
	SEP	CORNWALL WTP	DISTRIBUTION	.55 ug/L
		ST CATHARINES WSS	DISTRIBUTION	.95 ug/L
	OCT	PETERBOROUGH WSS	DISTRIBUTION	.60 ug/L
		PORT DOVER WSS	RAW	.70 ug/L
			TREATED	.70 ug/L
	NOV	OTTAWA WSS	TREATED	.70 ug/L
		(LEMIEUX ISLAND)		
		PORT DOVER WSS	TREATED	.50 ug/L
	DEC	PORT DOVER WSS	TREATED	.90 ug/L
			DISTRIBUTION	.60 ug/L

## Appendix A

### DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

#### Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate ( and retrofit if necessary ) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw ( ambient water ) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

#### Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

#### DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

#### PROGRAM INPUTS

##### PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

##### 1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

##### 2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

##### 3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

#### 4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

#### 5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

#### 6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

#### 7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

#### FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

## LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

### PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

### PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

### QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

#### ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

#### REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

#### ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

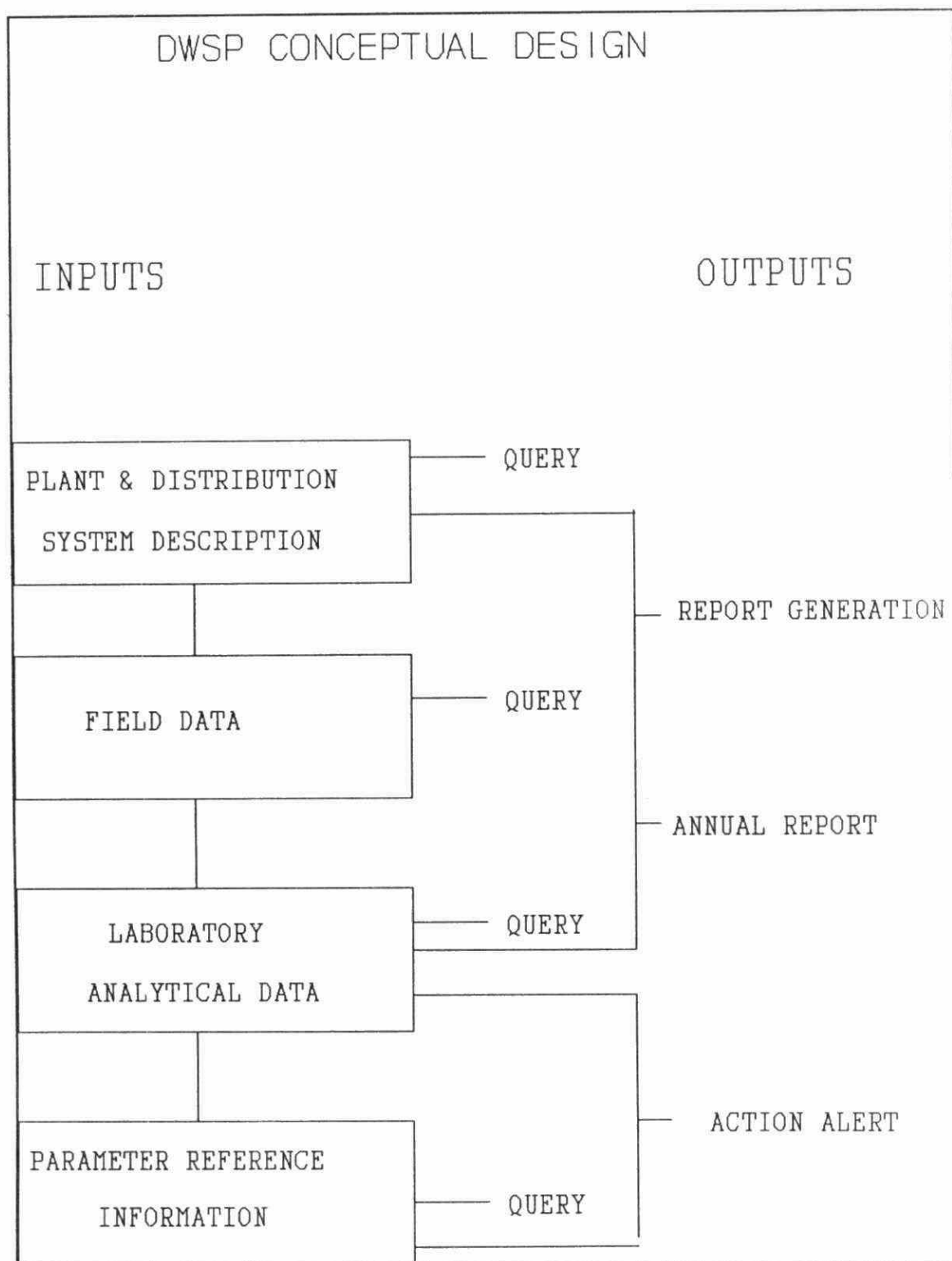


FIG.2

## MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)

PARAMETER

REFERENCE

BENZENE

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE:  $C_6H_6$ 

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),  
CYCLOHEXATRIENE (41)CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,  
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,  
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING  
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL

TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE

MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL

QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY

SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL T A R  
DISTILLATION, FOOD PROCESSING, TANNING.USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE  
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN  
PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,  
DEGREASING AND CLEANSING AGENT, GASOLINE.TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES  
MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS,  
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;  
CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM  
FOLLOWED BY SEDIMENTATION, COAGULATION AND  
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

HENRY'S LAW CONSTANT: 0.00555 ATM  $M_3$ /MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

## Appendix B

### DWSP SAMPLING GUIDELINE

#### i) RAW and TREATED at PLANT

General Chemistry	<ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-rinse bottle with sample three times and discard water</li><li>-fill to line</li></ul>
Bacti	<ul style="list-style-type: none"><li>-250 mL clear glass bottle with white seal on cap</li><li>-do <u>not</u> rinse bottle; preservative has been added</li><li>-avoid touching bottle neck or inside of cap</li><li>-fill to top of red label as marked</li></ul>
Metals	<ul style="list-style-type: none"><li>-500 mL clear plastic bottle with white lid</li><li>-rinse bottle and cap three times, discard</li><li>-fill to line</li><li>-add 10 drops nitric acid (<b>Caution:</b> <math>\text{HNO}_3</math> is corrosive)</li></ul>
Volatiles (OPOPUP)	<ul style="list-style-type: none"><li>-250 mL clear glass bottle</li><li>-do <u>not</u> rinse bottle</li><li>-tilt bottle when filling</li><li>-fill bottle completely; there should be no air bubbles.</li></ul>
Organic (OWOC), (OWTRI), (OAPAHX)	<ul style="list-style-type: none"><li>-1 liter brown glass bottle per scan</li><li>-do <u>not</u> rinse bottle</li><li>-fill to approx. 1" from top</li><li>-when 'special pesticides' are requested three extra bottles per sample must be submitted</li></ul>
Cyanide	<ul style="list-style-type: none"><li>-500 mL clear plastic bottle</li><li>-do <u>not</u> rinse bottle</li><li>-fill to approx. 1" from top</li><li>-add 10 drops sodium hydroxide (<b>Caution:</b> NaOH is corrosive)</li></ul>

## Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (Caution:  $\text{HNO}_3$  and  $\text{KCrO}_7$  corrosive)

## Phenols

- 250 mL clear glass bottle
- do not rinse bottle
- fill to top of label as marked

## Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid ( <b>Caution:</b> $\text{HNO}_3$ is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacteriology	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid ( <b>Caution:</b> $\text{HNO}_3$ is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC), (OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide ( <b>Caution:</b> NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate ( <b>Caution:</b> $\text{HNO}_3$ and $\text{KCrO}_7$ corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

## Appendix C

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### ALVINSTON WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Alvinston Water Treatment Plant is a conventional treatment plant which treats water from the Sydenham River. The treatment process consists of coagulation, flocculation, clarification (upflow clarifier), filtration and disinfection. This plant serves a population of approximately 800 people and has a design capacity of  $0.775 \times 1000\text{m}^3/\text{day}$ .

Raw and Treated water samples were taken in June and were analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

The treated water sample contained Coliform bacteria above the ODWO. The District Officer was notified.

The treated water sample contained a Laboratory Turbidity above the ODWO. The District Officer was notified. All other Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for, none exceeded any health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

For 1987 the DWSP sampling results indicated that the Alvinston Treatment Plant produced water of good quality.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      ALVINSTON WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

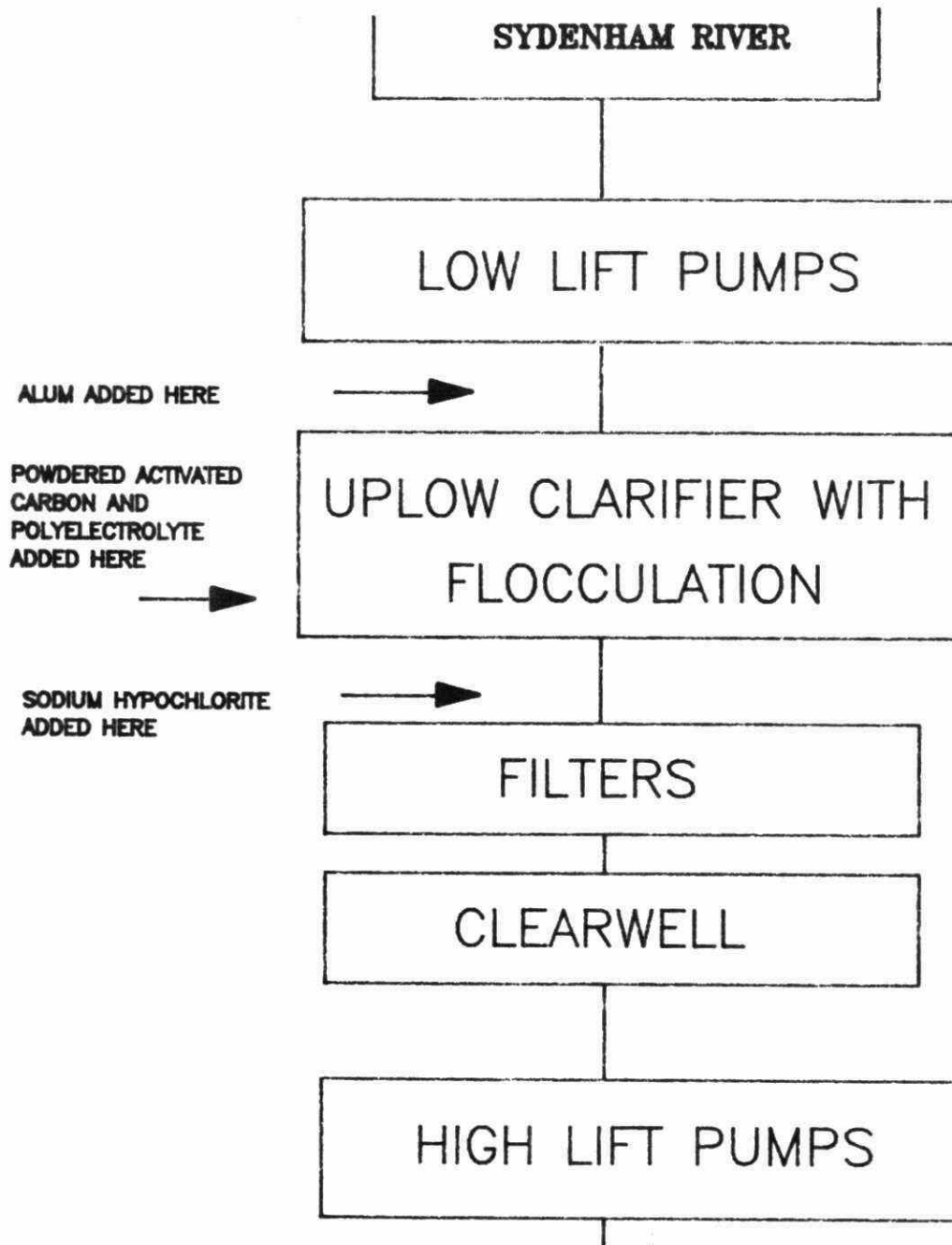
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	4	4	100	9	5	55
CHEMISTRY (FLD)	2	2	100	4	4	100
CHEMISTRY (LAB)	19	18	94	19	15	78
METALS	20	14	70	20	11	55
CHLOROAROMATICS	13	0	0	13	0	0
CHLOROPHENOLS	6	0	0	6	0	0
PESTICIDES & PCB	25	0	0	25	0	0
PHENOLICS	1	0	0	1	0	0
SPECIFIC PESTICIDES	35	1	2	36	1	2
VOLATILES	28	0	0	28	4	14
TOTAL	153	39		161	40	

COLIFORMS WERE PRESENT IN ONE TREATED WATER SAMPLE, THE ODWO FOR TURBIDITY WAS EXCEEDED IN ONE SAMPLE

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# ALVINSTON WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### AMHERSTBURG TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Amherstburg Water Treatment Plant is a conventional treatment plant which treats water from the Detroit River. The process consists of coagulation, flocculation, clarification (upflow clarifier), filtration, disinfection, activated carbon adsorption and fluoridation. This plant serves a population of approximately 15,957 people and has a design capacity of 18.8 x 1000m<sup>3</sup>/day.

Raw and Treated water samples were taken in June and November. Allowing for the appropriate retention time between the raw and treated sampling, the raw water was sampled November 30th and the treated December 1st. These samples were analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate the bacteriological quality of the water. Routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Amherstburg Treatment Plant produced good quality water at the plant.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM     AMHERSTBERG WATER TREATMENT PLANT

SUMMARY TABLE BY SCAN (1987)

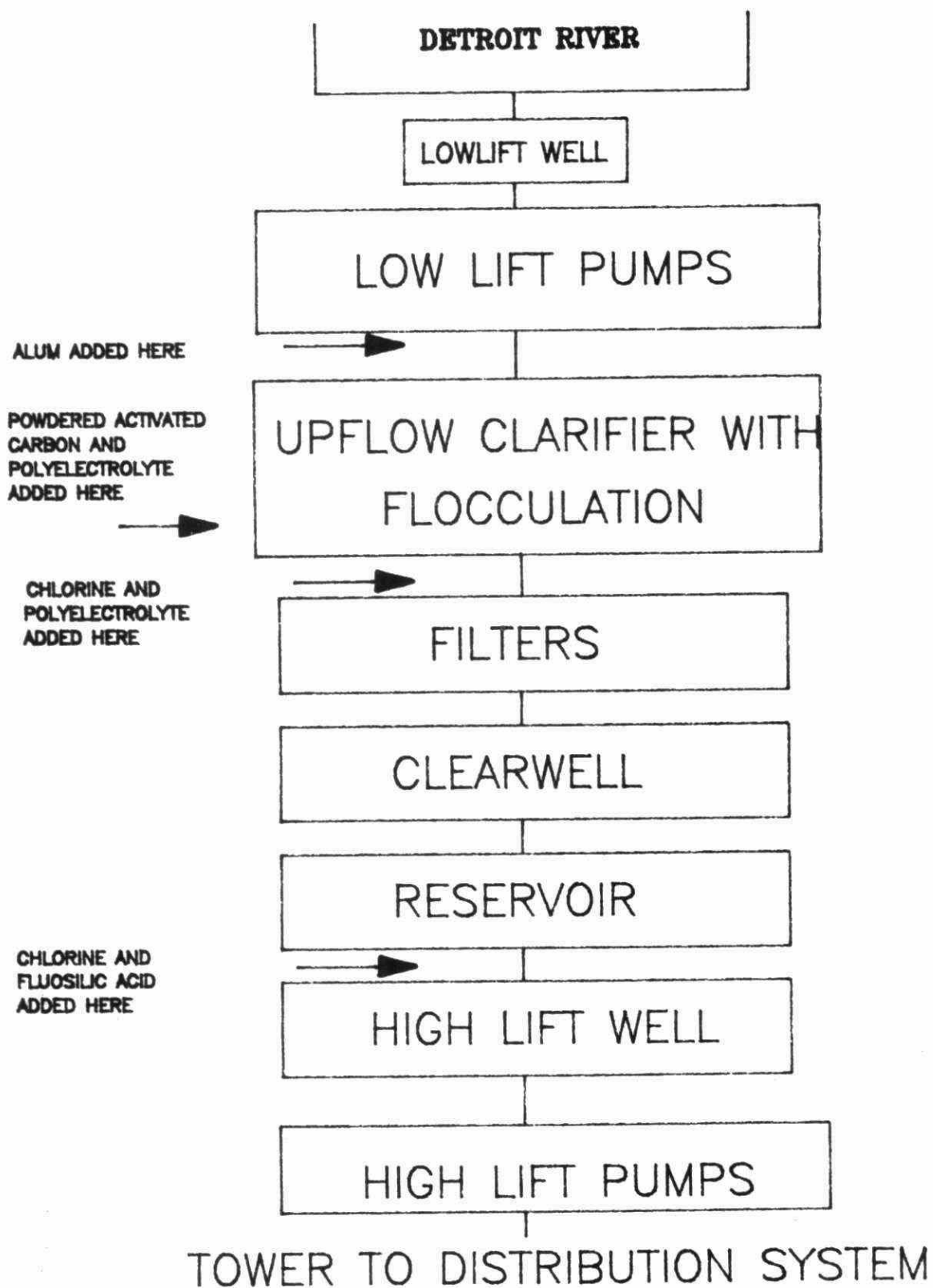
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	3	3	100	3	0	0
CHEMISTRY (FLD)	6	6	100	12	12	100
CHEMISTRY (LAB)	38	32	84	38	26	68
METALS	40	23	57	40	12	30
CHLOROAROMATICS	26	0	0	26	1	3
CHLOROPHENOLS	12	0	0	12	0	0
PAH	17	0	0	17	0	0
PESTICIDES & PCB	50	0	0	50	0	0
PHENOLICS	2	1	50	0	0	0
SPECIFIC PESTICIDES	72	0	0	72	0	0
VOLATILES	56	0	0	56	8	14
TOTAL	322	65		326	59	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# AMHERSTBURG WATER TREATMENT PLANT



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
BAYSIDE SCHOOL WATER TREATMENT PLANT  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Bayside School Water Treatment Plant is a conventional treatment plant that treats water from the Bay of Quinte. The treatment process consists of coagulation, flocculation, filtration and disinfection. This plant serves the three schools in Bayside, a population of 1,200 and has a design capacity of 0.11 x 1000m<sup>3</sup>/day.

Samples of the raw and treated water were taken six times in 1987 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in November only.

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. The ODWO for Total Coliforms was exceeded in one treated water sample. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Bayside School Water Treatment Plant produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      BAYSIDE W.T.P. (BAYSIDE SCHOOL) SYDNEY

## SUMMARY TABLE BY SCAN (1987)

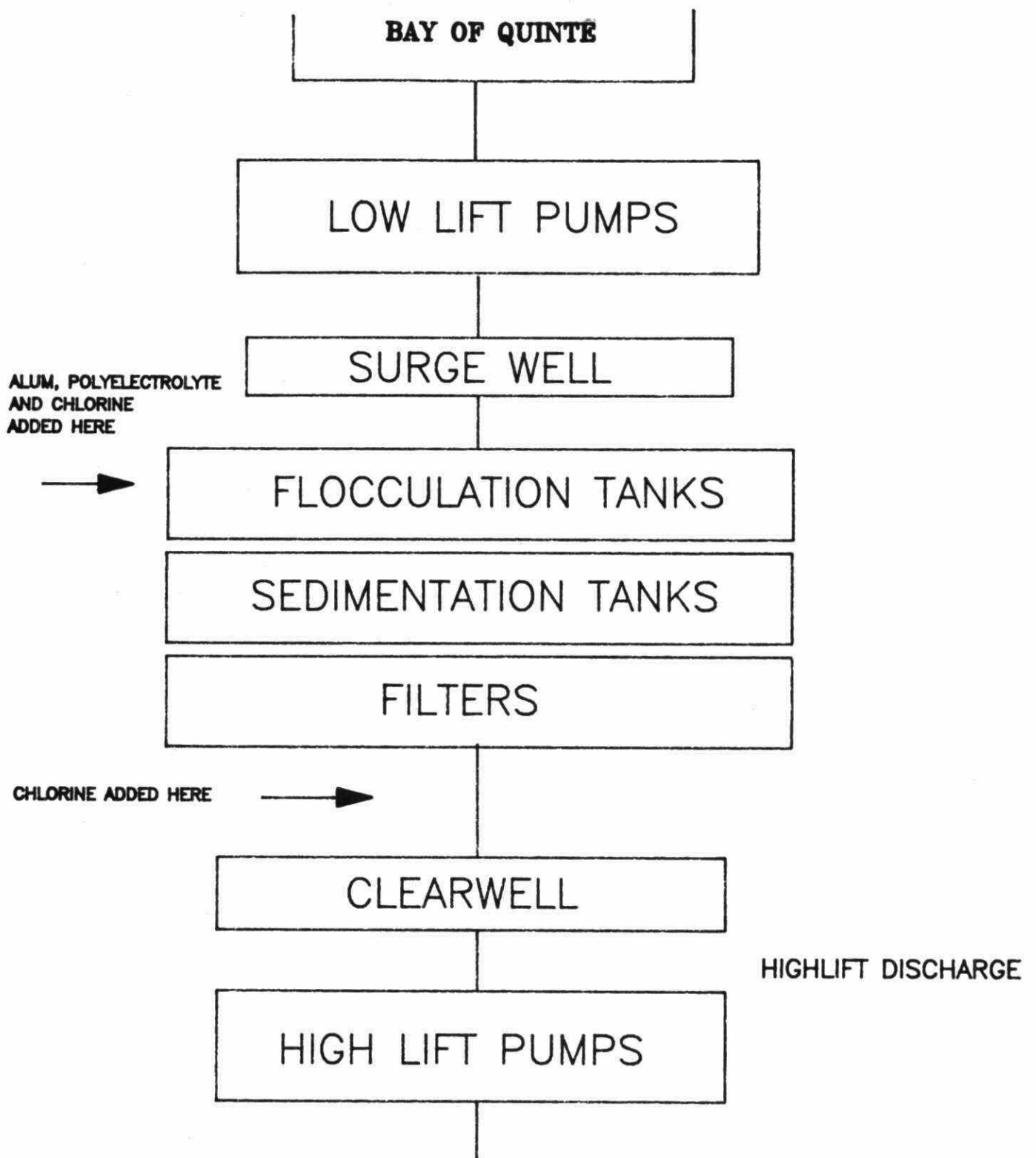
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	21	20	95	23	8	34
CHEMISTRY (FLD)	13	13	100	34	34	100
CHEMISTRY (LAB)	112	101	90	112	75	66
METALS	120	66	55	120	70	58
CHLOROAROMATICS	78	0	0	78	0	0
CHLOROPHENOLS	18	1	5	18	0	0
PAH	102	1	0	102	2	1
PESTICIDES & PCB	150	0	0	150	0	0
PHENOLICS	6	1	16	6	0	0
SPECIFIC PESTICIDES	114	0	0	114	0	0
VOLATILES	168	0	0	168	19	11
TOTAL	902	203		925	208	

COLIFORMS WERE DETECTED IN ONE TREATED WATER SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# BAYSIDE SCHOOL WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM BELLEVILLE WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Belleville Water Treatment Plant is a conventional treatment plant that treats water from the Bay of Quinte. The treatment process consists of coagulation, flocculation, sedimentation, filtration, fluoridation and disinfection. This plant serves a population of 37,000 and has a design capacity of 54 x 1000m<sup>3</sup>/day.

Water samples of the raw, treated and three distribution system sites were taken on a monthly basis. Sampling at distribution system Site 1 was discontinued in July and Site 2 was incorporated onto the program. The Belleville Water Treatment Plant was sampled for approximately 160 parameters, 9 times in 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Belleville Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      BELLEVILLE W.T.P.

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	30	30	100	35	7	20	16	3	18	16	3	18	44	14	31
CHEMISTRY (FLD)	26	26	100	54	54	100	34	34	100	42	42	100	88	88	100
CHEMISTRY (LAB)	153	131	85	171	130	76	131	116	88	165	146	88	329	283	86
METALS	179	91	50	179	82	45	157	85	54	195	119	61	391	216	55
CHLOROAROMATICS	78	0	0	104	0	0	52	2	3	65	0	0	130	1	0
CHLOROPHENOLS	6	0	0	6	0	0	.	.	.	.	.	.	.	.	.
PAH	68	0	0	68	0	0	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	157	0	0	201	0	0	97	0	0	125	0	0	248	0	0
PHENOLICS	9	1	11	9	0	0	.	.	.	.	.	.	.	.	.
SPECIFIC PESTICIDES	99	0	0	99	0	0	27	0	0	45	0	0	90	0	0
VOLATILES	252	12	4	252	28	11	113	12	10	140	15	10	253	27	10
TOTAL	1057	291		1178	301		627	252		793	325		1573	629	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

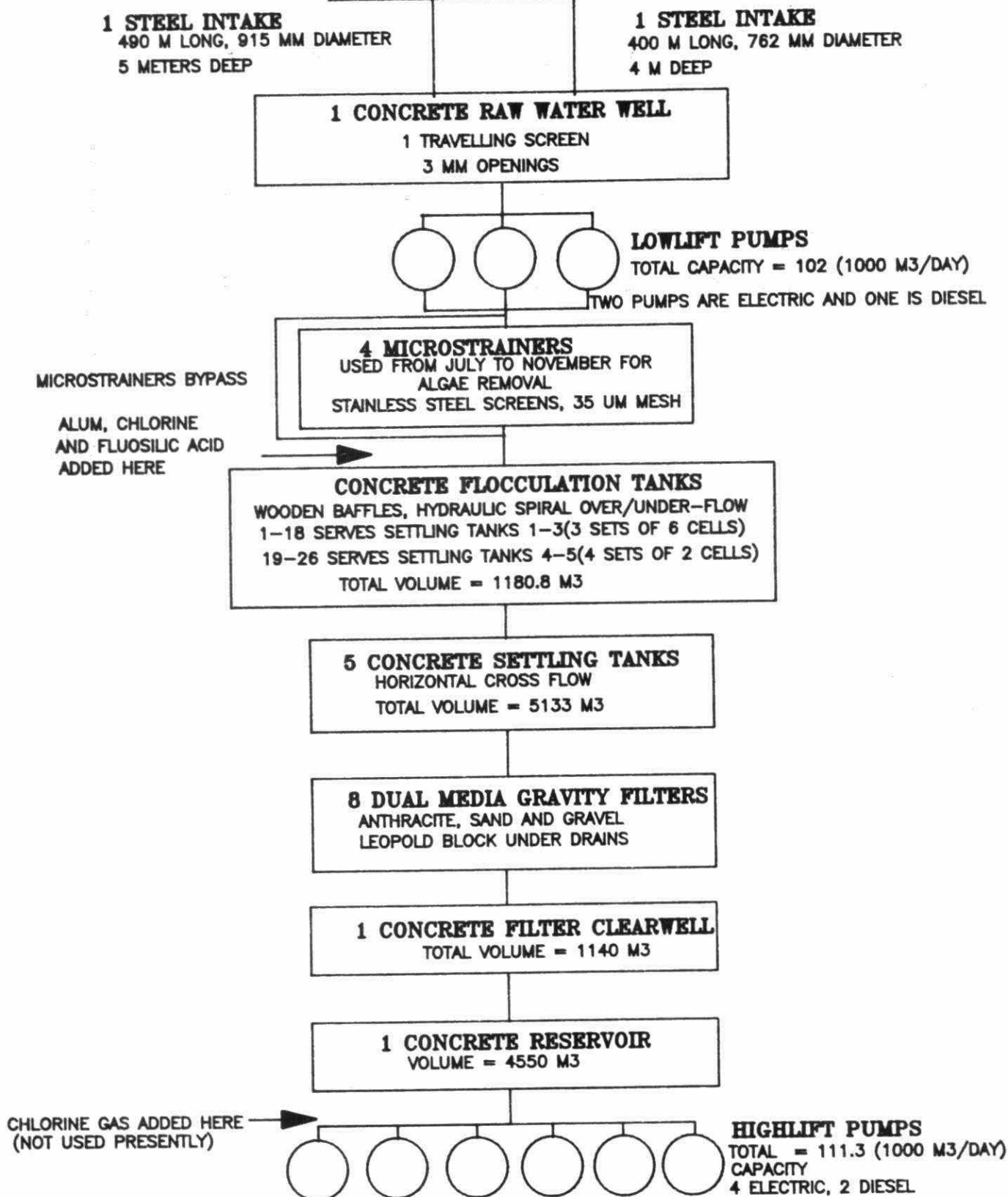
A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# Figure 2

## BELLEVILLE WATER TREATMENT PLANT

### BAY OF QUINTE



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### BRANTFORD WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Brantford Water Treatment Plant is a conventional treatment plant which treats water from the Grand River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 75,000 and has a design capacity of 90 x 1000m<sup>3</sup>/day.

Water samples from two distribution system sites were taken on a monthly basis beginning in March. Sampling at distribution system site three was discontinued in August and a new location was selected. Sampling of the raw water and the treated water began in December. The Brantford Water Supply was sampled for approximately 160 parameters, 10 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polyaromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides were analysed for in December only. Chlorophenols were not analysed for.

A summary of results is shown in Table 1.

Due to the sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below respective health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, only one exceeded an ODWO; Trihalomethanes (ODWO 350 ug/L) were found at 356.3 ug/L in a July distribution system sample.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Brantford Water Supply produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      BRANTFORD W.T.P.

## SUMMARY TABLE BY SCAN (1987)

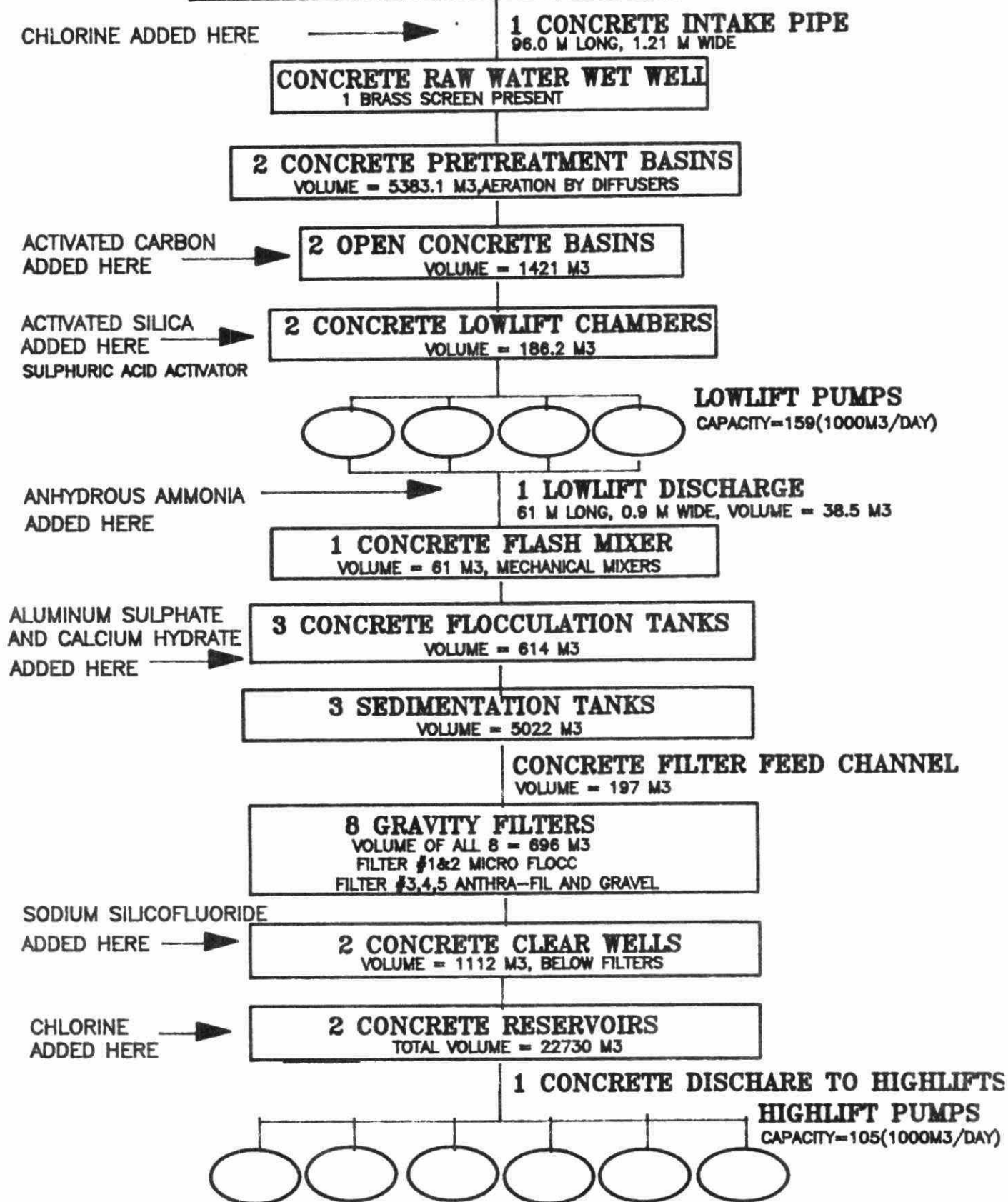
SCAN	RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	3	3	100	9	4	44	47	15	31	16	7	43	21	7	33
CHEMISTRY (FLD)	3	3	100	6	6	100	114	114	100	41	41	100	63	63	100
CHEMISTRY (LAB)	19	17	89	19	17	89	328	310	94	132	125	94	188	168	89
METALS	20	11	55	20	11	55	390	255	65	156	105	67	234	159	67
CHLOROAROMATICS	13	0	0	13	0	0	130	0	0	52	0	0	78	1	1
PAH	17	0	0	17	0	0	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	25	0	0	25	0	0	250	1	0	100	0	0	150	0	0
PHENOLICS	1	0	0	1	0	0	.	.	.	.	.	.	.	.	.
SPECIFIC PESTICIDES	9	0	0	9	0	0	90	1	1	36	0	0	54	0	0
VOLATILES	28	0	0	28	3	10	279	40	14	112	16	14	167	25	14
TOTAL	138	34		147	41		1628	736		645	294		955	423	

THE ODWO FOR TOTAL TRIHALOMETHANES WAS EXCEEDED IN ONE DISTRIBUTED WATER. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# BRANTFORD WATER TREATMENT PLANT GRAND RIVER VIA HOMEDALE CANAL



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### BURLINGTON WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Burlington Water Treatment Plant is a direct filtration plant which treats water from Lake Ontario. The treatment process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant serves a population of approximately 120,000 and has a design capacity of 227 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution system sites were taken on a monthly basis. Sampling at distribution system site one was discontinued in September. The Burlington Water Treatment Plant was sampled for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWO's.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Burlington Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      BURLINGTON WATER TREATMENT PLANT

SUMMARY TABLE BY SCAN (1987)

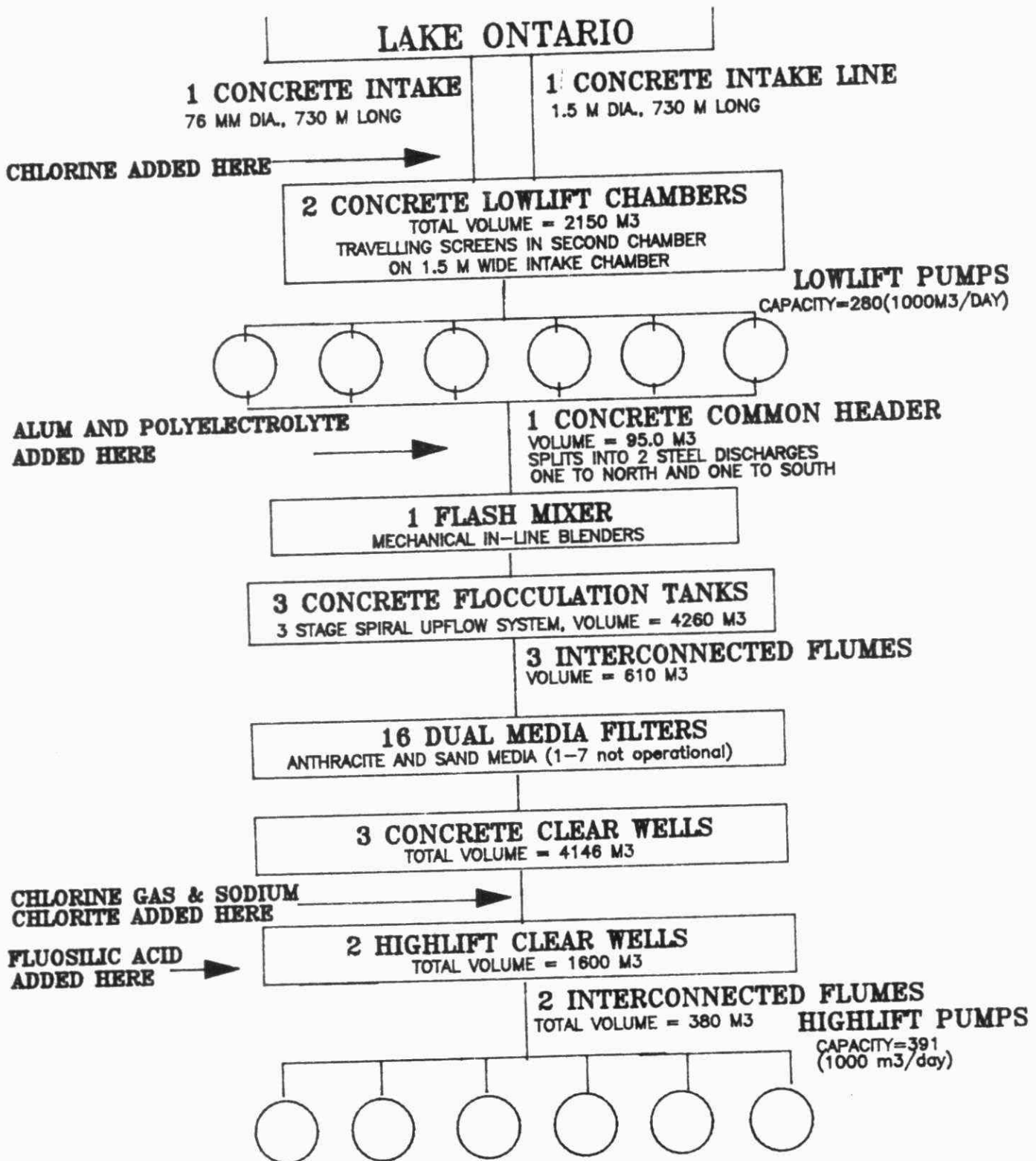
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	46	43	93	52	10	19	31	5	16	53	16	30
CHEMISTRY (FLD)	35	35	100	71	71	100	64	64	100	107	107	100
CHEMISTRY (LAB)	225	191	84	225	170	75	261	213	81	393	323	82
METALS	243	127	52	243	117	48	315	161	51	452	259	57
CHLOROAROMATICS	143	0	0	156	0	0	104	0	0	156	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	275	0	0	297	0	0	197	0	0	297	0	0
PHENOLICS	12	1	8	12	2	16	1	0	0	1	0	0
SPECIFIC PESTICIDES	162	0	0	162	0	0	72	0	0	108	0	0
VOLATILES	338	0	0	339	48	14	225	32	14	337	48	14
TOTAL	1542	397	26	1620	418	26	1270	475	37	1904	753	39

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2  
**BURLINGTON WATER TREATMENT PLANT**



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM CORNWALL WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Cornwall Water Treatment Plant is a conventional treatment plant which treats water from Lake St. Lawrence. The process consists of coagulation, flocculation and sedimentation, filtration, disinfection and fluoridation. A coagulant was not used during September, October, November and December. This plant serves a population of approximately 46,000 people and has a design capacity of 100 x 1000m<sup>3</sup>/day.

Water samples from two distribution system sites were taken on a monthly basis and analyzed for approximately 160 parameters, 10 times during 1987. Sampling of the raw and treated water at the plant was initiated in September and sampled on a monthly basis. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Fecal Coliforms were present in the December distribution system Site 2 free flow sample. The District Officer was notified. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of generally good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the limited DWSP sampling results indicated that the Cornwall Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      CORNWALL W.T.P.

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	16	16	100	16	3	18	33	9	27	42	18	42
CHEMISTRY (FLD)	12	12	100	24	24	100	89	89	100	81	81	100
CHEMISTRY (LAB)	76	64	84	76	59	77	297	256	86	297	248	83
METALS	80	40	50	80	39	48	351	186	52	351	194	55
CHLOROAROMATICS	52	0	0	52	0	0	91	0	0	91	0	0
CHLOROPHENOLS	6	0	0	6	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	100	0	0	100	0	0	179	0	0	179	0	0
PHENOLICS	4	0	0	4	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	63	0	0	63	0	0	72	0	0	72	0	0
VOLATILES	112	1	0	112	17	15	251	36	14	251	38	15
TOTAL	572	133		584	142		1363	576		1364	579	

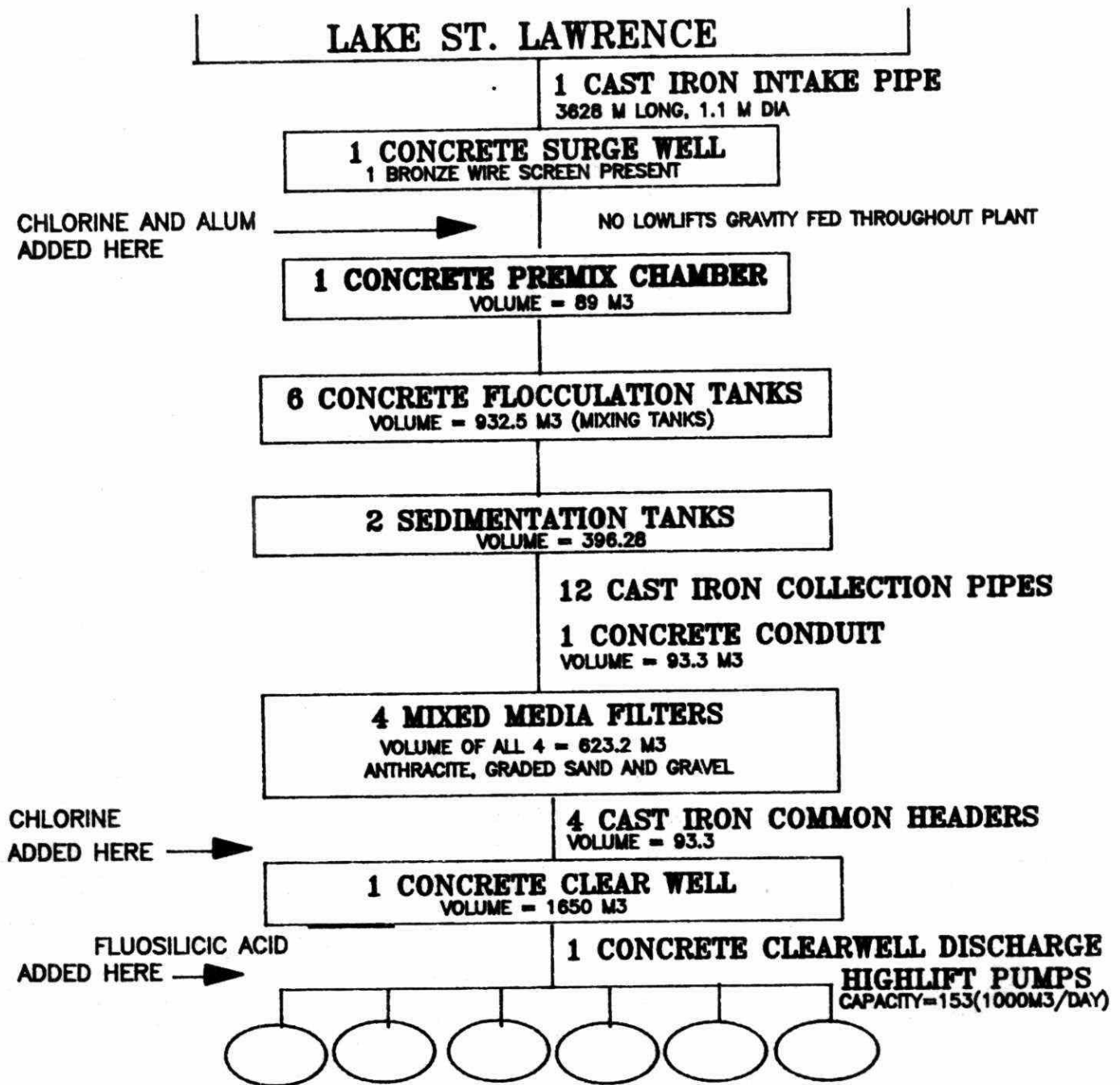
FECAL COLIFORMS WERE PRESENT IN ONE DISTRIBUTION WATER. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# CORNWALL WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### DESERONTO WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Deseronto Water Treatment Plant is a conventional treatment plant that treats water from the Bay of Quinte. The treatment process consists of flocculation, sedimentation, filtration, and disinfection. This plant serves a population of 2,000 people and has a design capacity of  $2.9 \times 1000\text{m}^3/\text{day}$ .

Water samples from the raw, treated and one distribution site were taken on a biweekly basis. The Deseronto Water Treatment Plant was sampled, for approximately 160 parameters, six times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in November only.

A summary of results is shown in Table 1.

Due to its sampling frequency the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination, the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a biweekly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Deseronto Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      DESERONTO

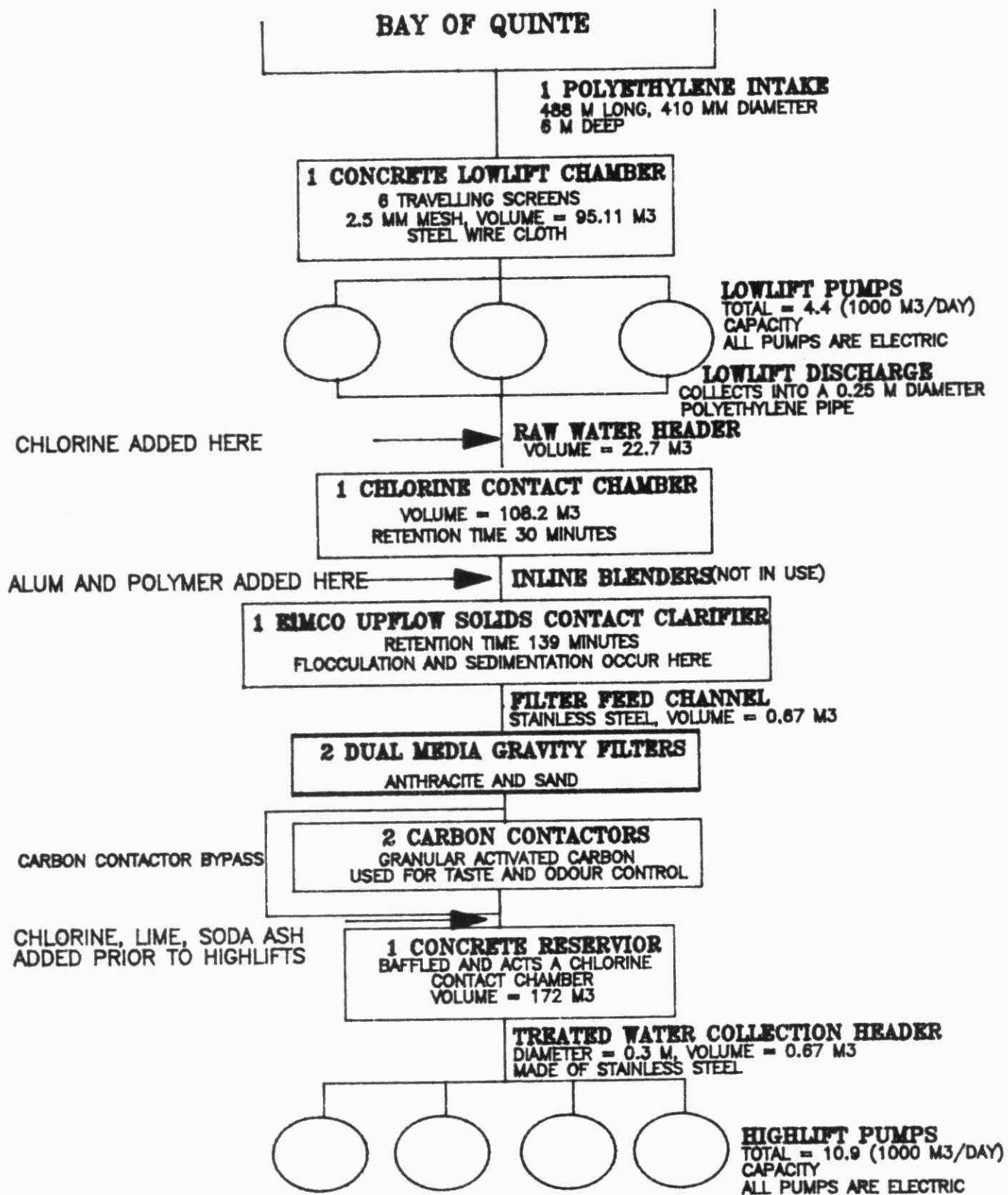
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	23	21	91	23	6	26	23	5	21
CHEMISTRY (FLD)	18	18	100	36	36	100	53	53	100
CHEMISTRY (LAB)	114	102	89	114	92	80	198	181	91
METALS	120	56	46	120	61	50	234	134	57
CHLOROAROMATICS	78	0	0	78	0	0	78	0	0
CHLOROPHENOLS	6	0	0	6	0	0	.	.	.
PAH	102	0	0	102	0	0	.	.	.
PESTICIDES & PCB	150	0	0	148	0	0	148	0	0
PHENOLICS	5	0	0	5	1	20	.	.	.
SPECIFIC PESTICIDES	81	0	0	72	0	0	45	0	0
VOLATILES	168	2	1	167	21	12	168	21	12
TOTAL	865	199		871	217		947	394	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# Figure 2 DESERONTO WATER TREATMENT PLANT



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
DRESDEN WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Dresden Water Treatment Plant is a direct filtration plant which treats water from the Sydenham River. The process consists of coagulation, flocculation, filtration, and disinfection. This plant serves a population of approximately 2500 and has a rated capacity of  $3.8 \times 1000\text{m}^3/\text{day}$ .

Water samples from the raw and treated water at the plant were taken in June and November. The Dresden Water Treatment Plant was sampled for approximately 160 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polyaromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency full evaluation of the bacteriological quality of water could not be made; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters were below any health related ODWOs with the exception of Nitrate in the November treated water sample.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Dresden Water Treatment Plant produced good quality water.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

DRESDEN WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

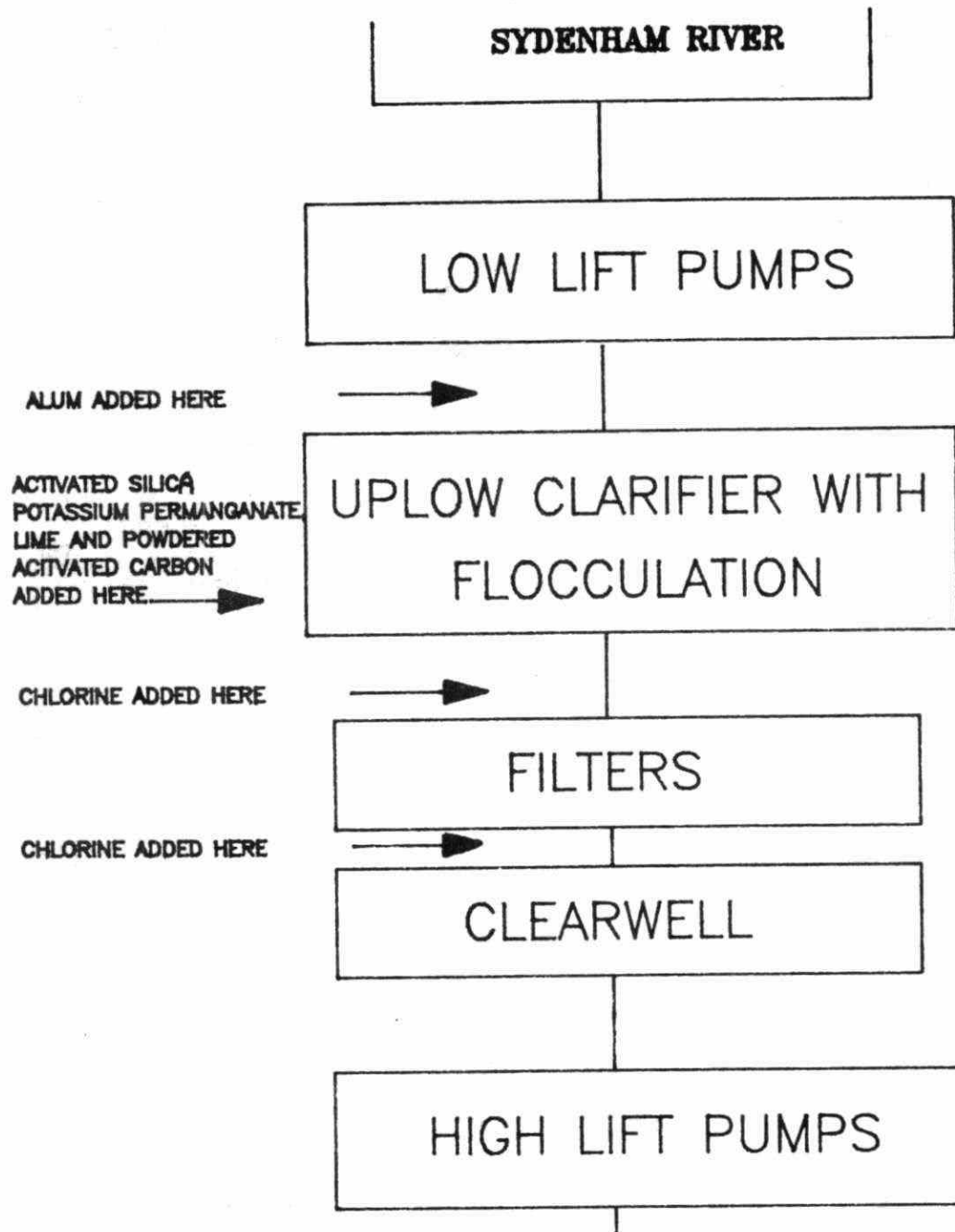
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	8	100	8	4	50
CHEMISTRY (FLD)	5	5	100	12	12	100
CHEMISTRY (LAB)	38	34	89	38	29	76
METALS	40	28	70	40	26	65
CHLOROAROMATICS	13	0	0	13	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	0	0	0	0	0	0
PESTICIDES & PCB	28	0	0	28	0	0
PHENOLICS	1	0	0	1	0	0
SPECIFIC PESTICIDES	62	3	4	56	3	5
VOLATILES	56	0	0	56	8	14
TOTAL	263	78		264	82	

THE ODWO FOR NITRATES WAS EXCEEDED IN ONE TREATED WATER SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2  
DRESDEN WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### ELGIN/ST. THOMAS WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Elgin/St. Thomas Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie. The process consists of flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 54,200 and has a design capacity of 45 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis. The Elgin/St. Thomas Water Treatment Plant was sampled, for approximately 160 parameters, 10 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Elgin/St. Thomas Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM ELGIN ST THOMAS (YARMOUTH TWP.)

## SUMMARY TABLE BY SCAN (1987)

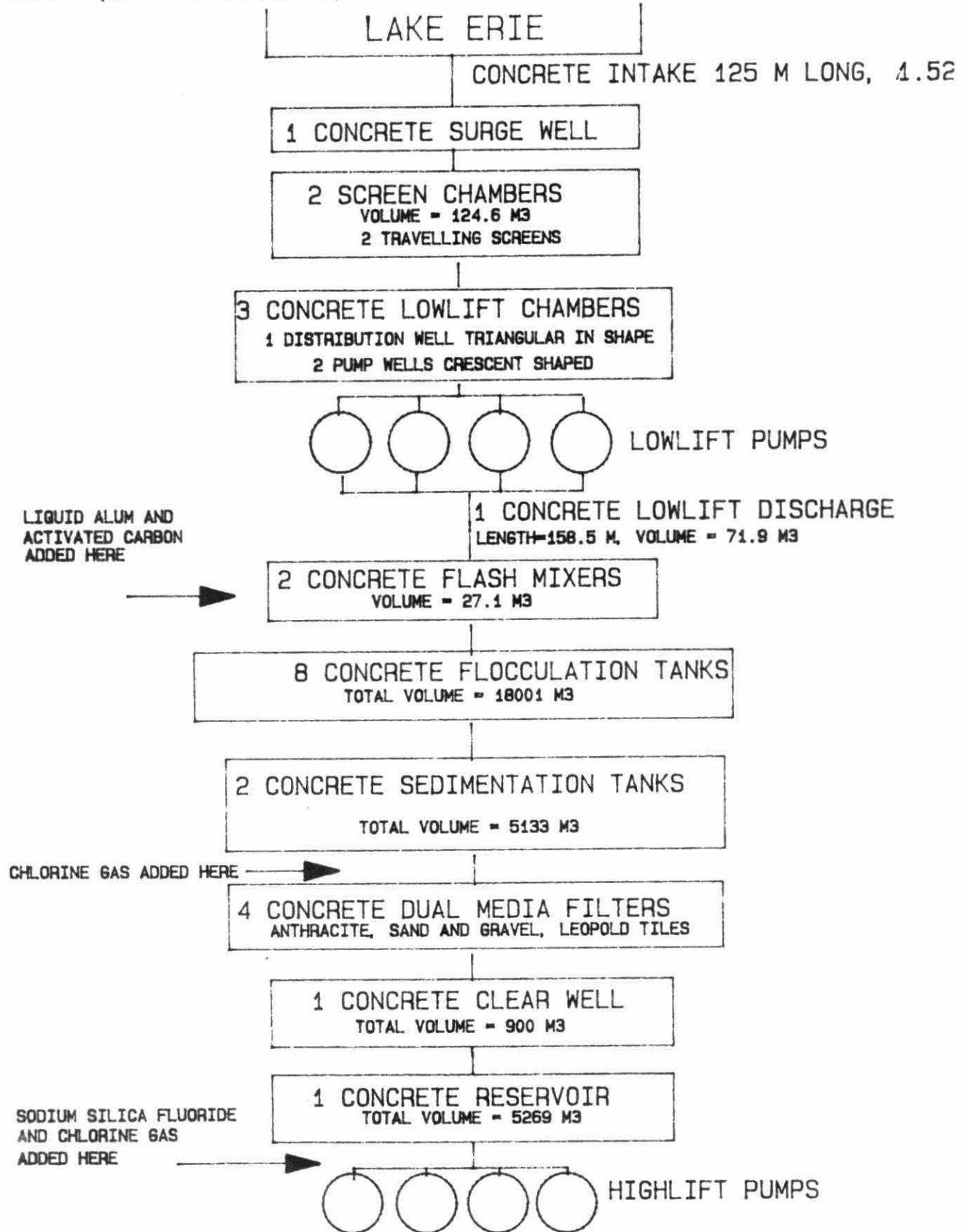
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	37	35	94	45	13	28	40	10	25	45	8	17
CHEMISTRY (FLD)	30	30	100	59	59	100	119	119	100	115	115	100
CHEMISTRY (LAB)	188	168	89	189	128	67	304	238	78	328	257	78
METALS	201	110	54	201	91	45	374	175	46	359	184	51
CHLOROAROMATICS	130	0	0	130	0	0	117	0	0	130	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	34	0	0	.	.	.	.	.	.
PESTICIDES & PCB	249	0	0	249	0	0	225	0	0	249	0	0
PHENOLICS	10	0	0	10	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	132	0	0	144	0	0	81	0	0	90	0	0
VOLATILES	279	1	0	279	41	14	279	42	15	280	40	14
TOTAL	1319	344		1352	332		1539	584		1596	604	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# ELGIN (ST THOMAS) WATER TREATMENT PLANT.



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### FORT ERIE WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Fort Erie Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of approximately 25,000 people and has a design capacity of 50 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 9 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. Fecal Coliforms were present in one sample in the distribution system. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Fort Erie Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM FORT ERIE W.T.P.

## SUMMARY TABLE BY SCAN (1987)

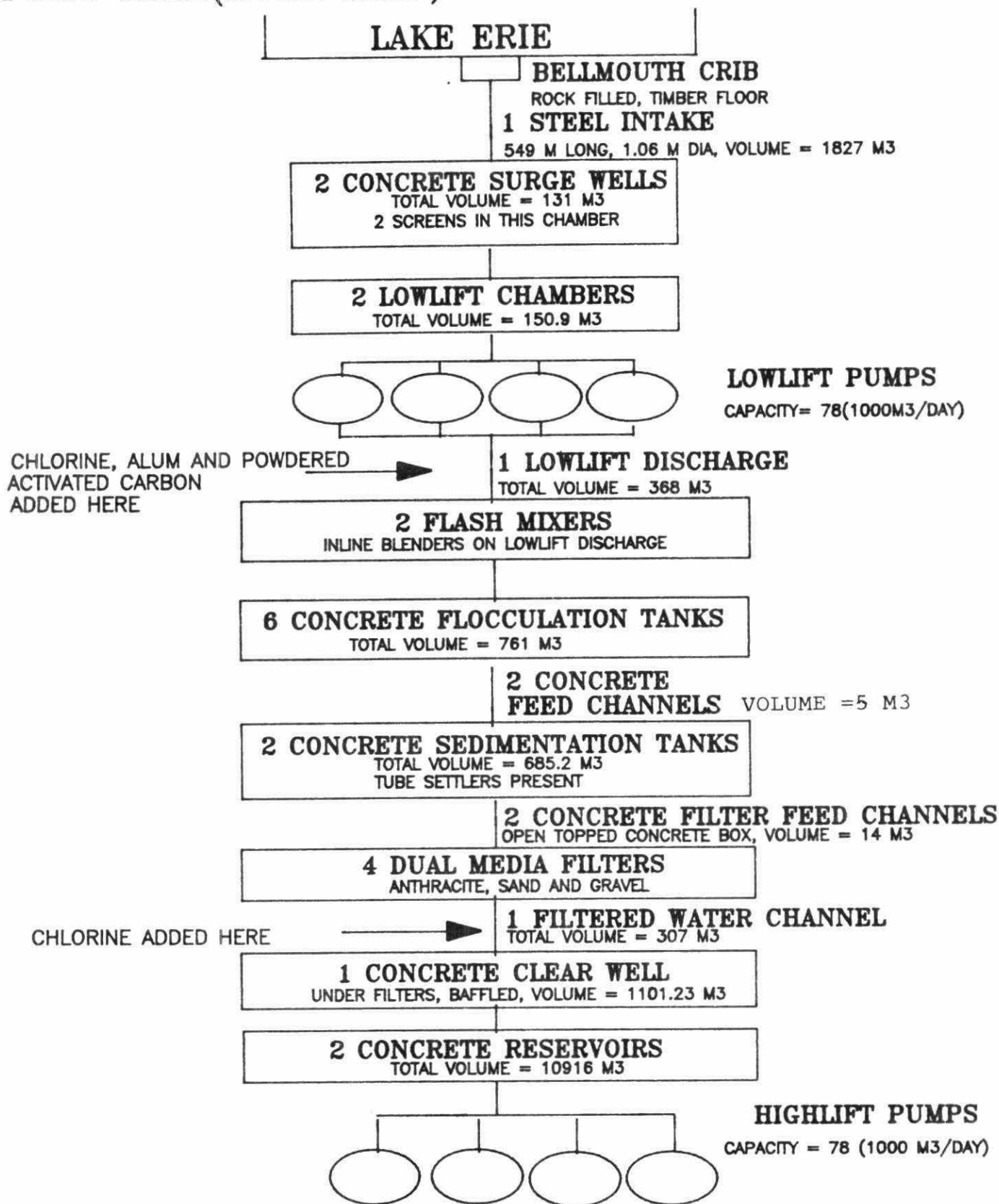
SCAN	RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	20	17	85	24	6	25	36	12	33	17	9	52	13	4	30
CHEMISTRY (FLD)	15	15	100	36	36	100	74	74	100	27	27	100	8	8	100
CHEMISTRY (LAB)	95	71	74	114	77	67	280	234	83	99	82	82	65	55	84
METALS	100	47	47	105	48	45	299	156	52	117	56	47	79	39	49
CHLOROAROMATICS	65	0	0	52	0	0	91	0	0	26	0	0	26	0	0
CHLOROPHENOLS	6	0	0	6	0	0	.	.	.	.	.	.	.	.	.
PAH	34	0	0	34	0	0	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	125	0	0	106	0	0	179	0	0	53	0	0	49	0	0
PHENOLICS	5	0	0	6	0	0	.	.	.	.	.	.	.	.	.
SPECIFIC PESTICIDES	63	0	0	72	0	0	81	0	0	27	0	0	18	0	0
VOLATILES	140	0	0	168	25	14	225	34	15	84	12	14	57	9	15
TOTAL	668	150		723	192		1265	510		450	186		315	115	

FECAL COLIFORMS WERE PRESENT IN ONE DISTRIBUTED WATER. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# FORT ERIE(ROSE HILL) WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### GRIMSBY WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Grimsby Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consist of coagulation, flocculation, sedimentation, filtration and disinfection. Powdered activated carbon is added on as necessary in the summer months to prevent taste and odour problems. This plant serves a population of approximately 15,000 people and has a design capacity of 19 x 1000m<sup>3</sup>/day.

Water samples from one distribution system site were taken on a monthly basis and analyzed for approximately 160 parameters, 11 times during 1987. Sampling of raw and treated water at the plant was initiated in April and was continued on a monthly basis. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Due to the sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Grimsby Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM GRIMSBY W.T.P.

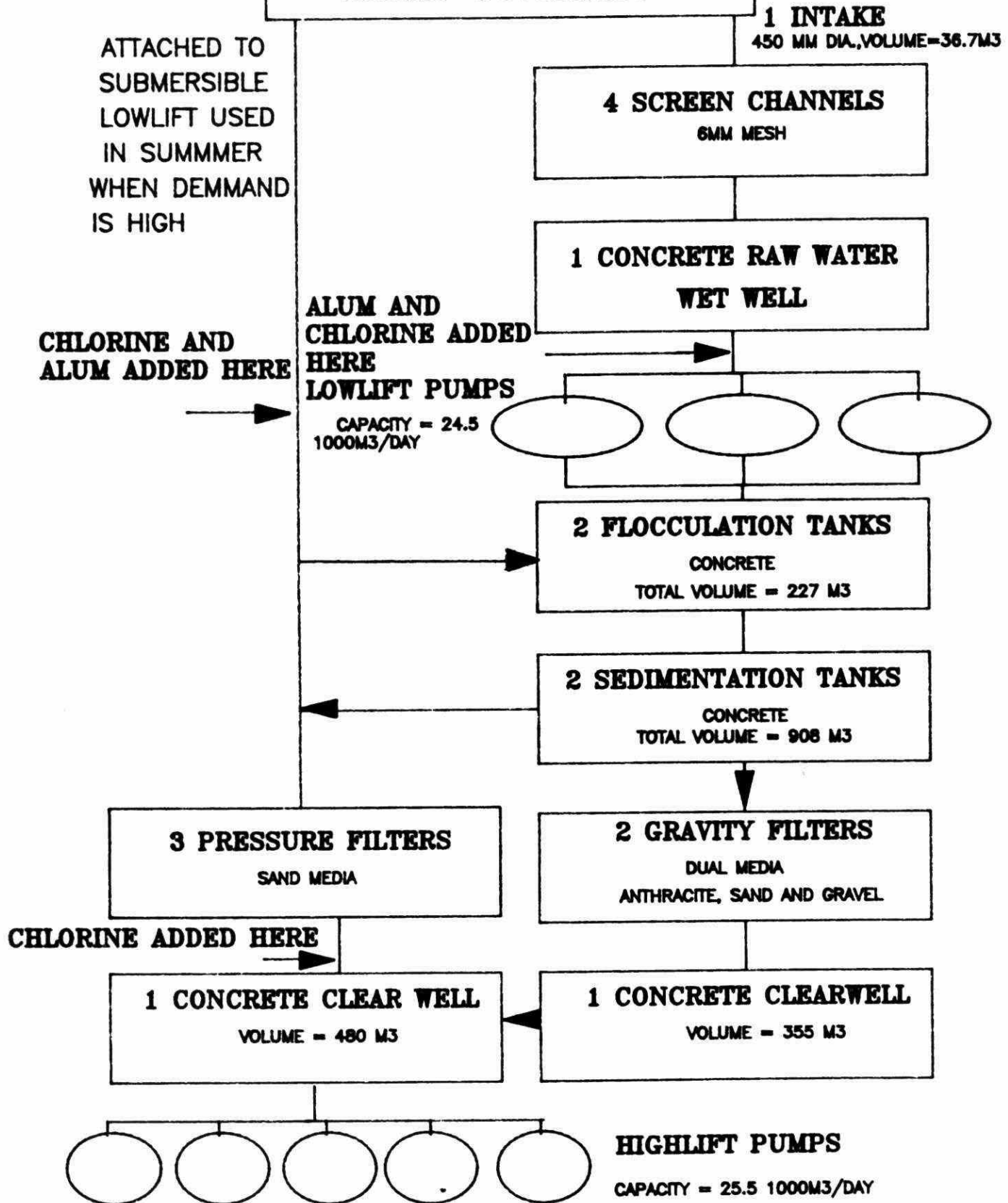
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	31	29	93	32	10	31	43	12	27
CHEMISTRY (FLD)	27	27	100	54	54	100	82	82	100
CHEMISTRY (LAB)	171	147	85	171	119	69	361	299	82
METALS	180	102	56	150	76	50	397	221	55
CHLOROAROMATICS	117	0	0	104	0	0	143	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.
PAH	51	0	0	34	0	0	.	.	.
PESTICIDES & PCB	223	0	0	201	1	0	273	0	0
PHENOLICS	9	1	11	9	0	0	.	.	.
SPECIFIC PESTICIDES	126	0	0	126	0	0	99	0	0
VOLATILES	252	2	0	252	37	14	309	46	14
TOTAL	1199	308		1145	297		1707	660	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# FIGURE 2 GRIMSBY WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### HAMILTON WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Hamilton Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 412,000 people and has a design capacity of 909 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analysed for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Hamilton Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      HAMILTON WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	44	34	77	44	12	27	44	12	27	50	13	26
CHEMISTRY (FLD)	38	38	100	62	62	100	101	101	100	91	91	100
CHEMISTRY (LAB)	226	192	84	189	143	75	357	314	87	394	349	88
METALS	241	142	58	222	117	52	431	246	57	468	264	56
CHLOROAROMATICS	156	0	0	143	1	0	130	0	0	143	0	0
CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.
PAH	68	2	2	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	298	0	0	273	0	0	251	0	0	276	0	0
PHENOLICS	12	0	0	11	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	162	3	1	144	0	0	99	0	0	108	0	0
VOLATILES	337	1	0	253	36	14	308	44	14	338	49	14
TOTAL	1594	412		1398	371		1721	717		1868	766	

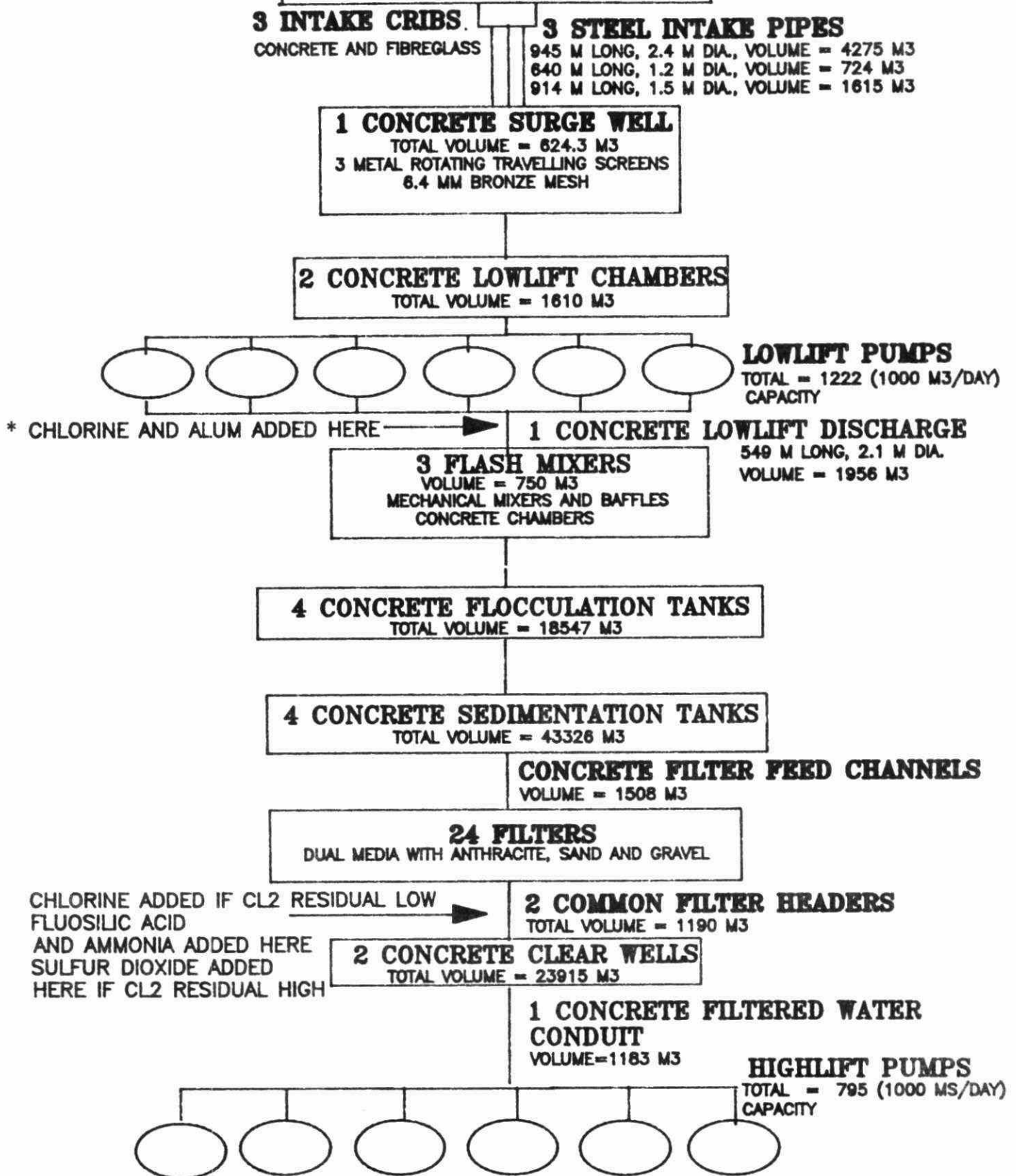
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# HAMILTON WATER TREATMENT PLANT LAKE ONTARIO



\* Polyaluminum chloride when necessary

EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
HARROW-COLCHESTER WATER TREATMENT PLANT  
ANNUAL REPORT 1987

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Harrow-Colchester Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie. The process consists of coagulation, flocculation, clarification (upflow clarifier), filtration, disinfection and activated carbon adsorption. This plant serves a population of approximately 3,328 people and has a design capacity of 10 x 1000m<sup>3</sup>/day.

Raw and Treated water samples were taken in June and November and were analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency all aspects of the bacteriological quality of water could not be fully evaluated; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Harrow-Colchester Water Treatment Plant produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      HARROW-COLCHESTER WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

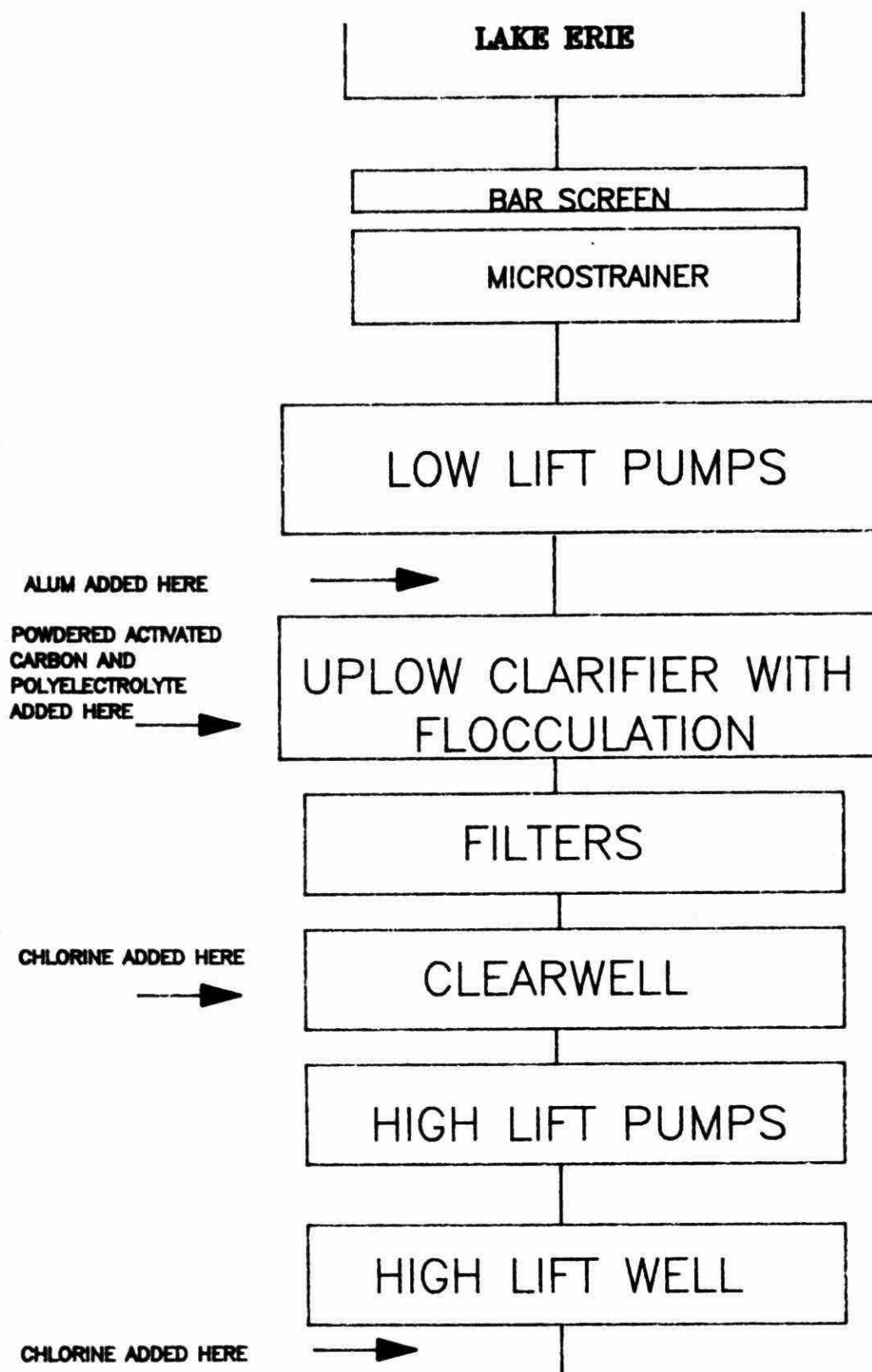
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	4	3	75	8	1	12
CHEMISTRY (FLD)	6	6	100	12	12	100
CHEMISTRY (LAB)	38	32	84	38	25	65
METALS	40	23	57	40	14	35
CHLOROAROMATICS	26	0	0	26	0	0
CHLOROPHENOLS	12	1	8	12	0	0
PAH	17	0	0	17	0	0
PESTICIDES & PCB	50	0	0	50	0	0
PHENOLICS	1	0	0	2	0	0
SPECIFIC PESTICIDES	71	0	0	71	0	0
VOLATILES	56	0	0	56	8	14
TOTAL	321	65		332	60	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2  
HARROW-COLCHESTER WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### KINGSTON WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Kingston Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of approximately 81,000 people and has a design capacity of 94.4 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination, the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Kingston Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      KINGSTON WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

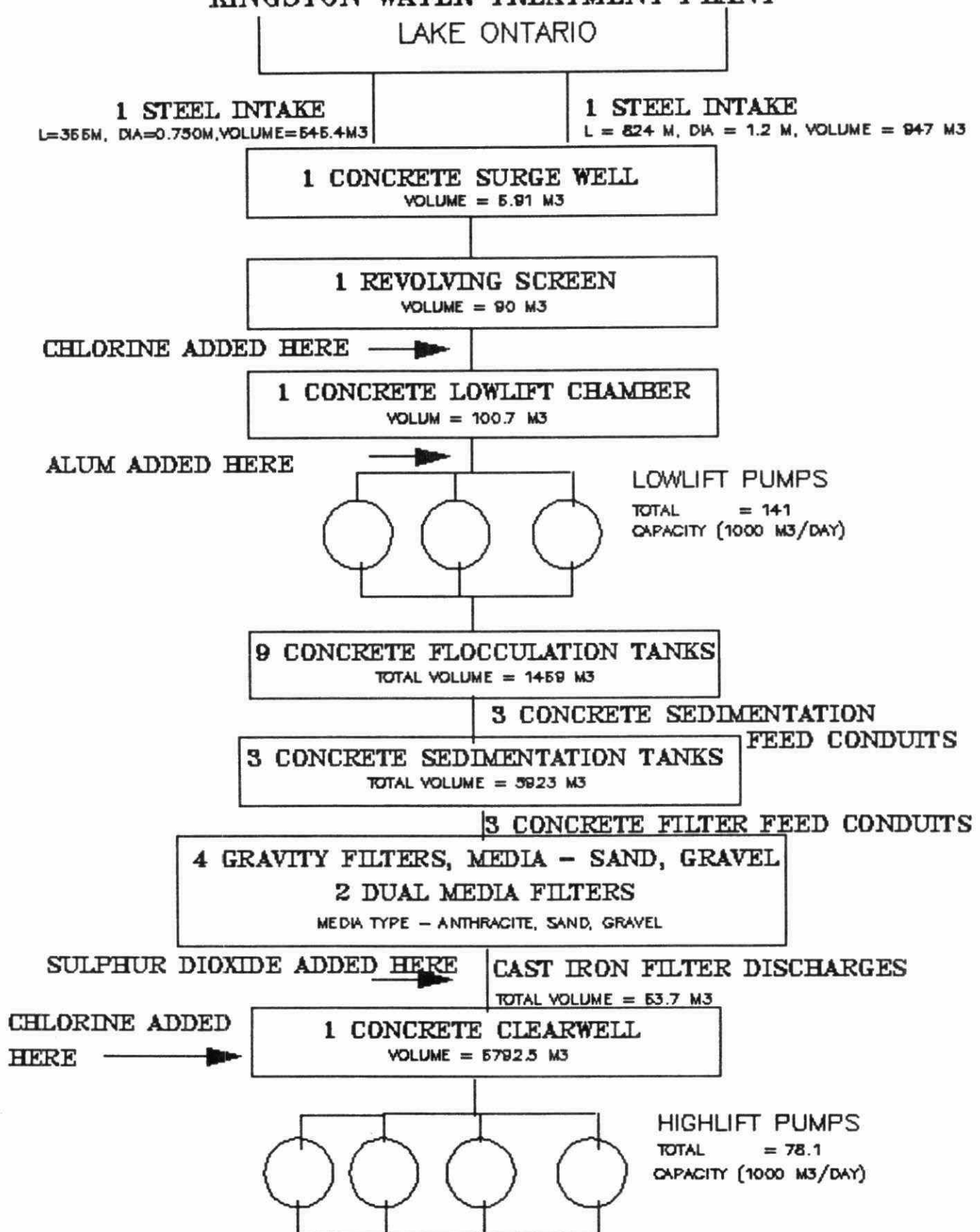
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	48	41	85	53	10	18	46	15	32	47	13	27
CHEMISTRY (FLD)	36	36	100	72	72	100	90	90	100	88	88	100
CHEMISTRY (LAB)	225	192	85	208	142	68	381	320	83	393	328	83
METALS	243	128	52	243	106	43	454	223	49	471	230	48
CHLOROAROMATICS	156	0	0	156	0	0	143	1	0	130	1	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	297	0	0	297	0	0	273	0	0	251	0	0
PHENOLICS	12	1	8	12	1	8	1	0	0	1	0	0
SPECIFIC PESTICIDES	162	0	0	162	0	0	99	0	0	99	0	0
VOLATILES	339	3	0	338	48	14	337	48	14	338	48	14
TOTAL	1581	401		1604	379		1824	697		1818	708	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# FIGURE 2 KINGSTON WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM KITCHENER WATER SUPPLY 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Kitchener Water Supply source consists of many wells. Three locations were sampled on the DWSP. The locations were K70 recharge well which receives recharged water from the Grand River, K21 wells supplying the Mannheim Reservoir and the third location was the treated water from the Strange Street Reservoir which contains a mixture of water from various well sources. The only treatment process applied to this water is disinfection.

Water samples were taken on a monthly basis at all locations except for the Strange Street Reservoir which was shut down for maintenance for part of the year. The Kitchener Water Supply was sampled, for approximately 160 parameters, monthly from March, 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Kitchener Water Supply produced good quality water at the plant.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM K 70 RECHARGE WELL, KITCHENER

## SUMMARY TABLE BY SCAN (1987)

	SCAN	RAW			TREATED		
		TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
101	BACTERIOLOGICAL	39	14	35	43	9	20
	CHEMISTRY (FLD)	20	20	100	49	49	100
	CHEMISTRY (LAB)	189	146	77	189	151	79
	METALS	201	87	43	201	88	43
	CHLOROAROMATICS	130	0	0	130	0	0
	CHLOROPHENOLS	12	0	0	12	0	0
	PAH	34	0	0	34	0	0
	PESTICIDES & PCB	247	0	0	247	0	0
	PHENOLICS	10	1	10	10	1	10
	SPECIFIC PESTICIDES	134	0	0	134	0	0
	VOLATILES	279	3	1	280	32	11
TOTAL	1295	271		1329	330		

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM KITCHENER WELL SUPPLY K21, MANNHEIM RES

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	43	14	32	47	13	27
CHEMISTRY (FLD)	22	22	100	35	35	100
CHEMISTRY (LAB)	208	142	68	188	123	65
METALS	221	109	49	221	103	46
CHLOROAROMATICS	130	0	0	143	0	0
CHLOROPHENOLS	6	0	0	12	0	0
PAH	51	0	0	51	0	0
PESTICIDES & PCB	250	0	0	272	0	0
PHENOLICS	11	1	9	9	1	11
SPECIFIC PESTICIDES	138	0	0	144	0	0
VOLATILES	307	1	0	308	16	5
TOTAL	1387	289		1430	291	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A ' . ' INDICATES THAT NO SAMPLE WAS TAKEN

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

STRANGE STREET RESERVOIR, KITCHENER

## SUMMARY TABLE BY SCAN (1987)

	SCAN	TREATED		
		TESTS	POSITIVE	%POSITIVE
103	BACTERIOLOGICAL	30	6	20
	CHEMISTRY (FLD)	29	29	100
	CHEMISTRY (LAB)	150	104	69
	METALS	162	78	48
	CHLOROAROMATICS	104	0	0
	CHLOROPHENOLS	6	0	0
	PAH	34	6	17
	PESTICIDES & PCB	198	0	0
	PHENOLICS	8	1	12
	SPECIFIC PESTICIDES	99	0	0
	VOLATILES	225	32	14
TOTAL		1045	256	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A ' , ' INDICATES THAT NO SAMPLE WAS TAKEN

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### LAKE HURON WATER SUPPLY SYSTEM 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Lake Huron Water Supply System is a conventional treatment plant which treats water from Lake Huron. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. Treated water from this plant is pumped to London where it is fluoridated prior to distribution. This plant serves a population of approximately 275,000 people and has a design capacity of 345.5 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated, Arva Reservoir and two distribution system sites were taken on a monthly basis. Sampling at distribution system Site 3 was discontinued in March and Site 2 was incorporated onto the program. The Lake Huron Water Supply System was sampled, for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water, however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating agency. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Lake Huron Water Supply System produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM LAKE HURON WATER SUPPLY SYSTEM

## SUMMARY TABLE BY SCAN (1987)

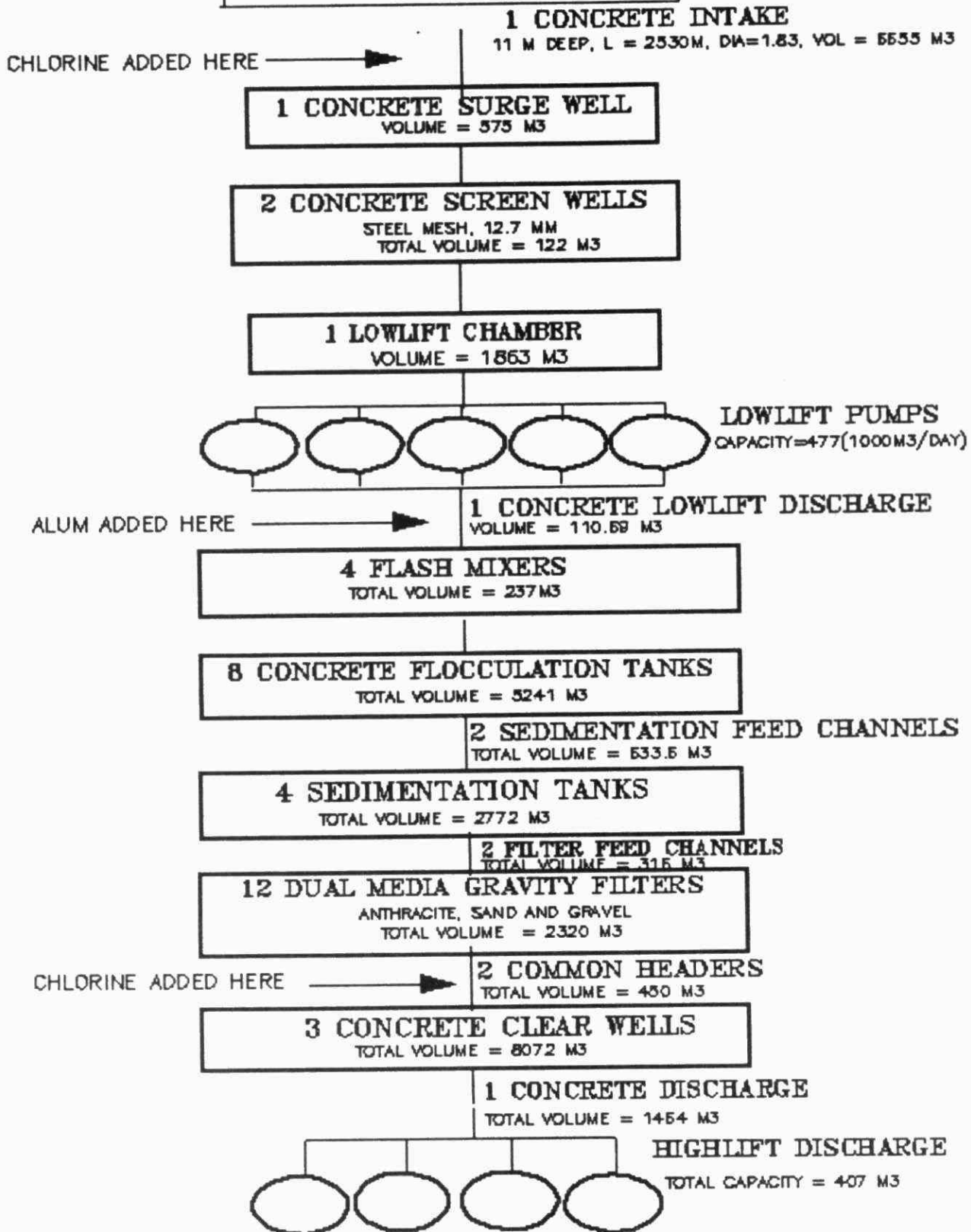
SCAN	RAW			TREATED1			TREATED2			SITE1			SITE 2			SITE 3		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	30	21	70	38	6	15	42	7	16	31	3	9	14	1	7	8	0	0
CHEMISTRY (FLD)	30	30	100	60	60	100	60	60	100	54	54	100	51	51	100	20	20	100
CHEMISTRY (LAB)	207	162	78	207	143	69	214	143	66	167	125	74	191	149	78	64	52	81
METALS	208	100	48	223	110	49	239	93	38	200	87	43	235	112	47	80	35	43
CHLOROAROMATICS	143	0	0	143	0	0	156	0	0	91	0	0	78	0	0	26	0	0
CHLOROPHENOLS	12	0	0	12	0	0	12	0	0	.	.	.	.	.	.	.	.	.
PAH	34	0	0	17	0	0	51	0	0	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	269	0	0	270	0	0	293	0	0	174	0	0	149	0	0	48	0	0
PHENOLICS	10	1	10	11	0	0	10	0	0	.	.	.	.	.	.	1	0	0
SPECIFIC PESTICIDES	144	0	0	144	0	0	144	0	0	63	0	0	54	0	0	18	0	0
VOLATILES	282	1	0	310	45	14	338	49	14	226	33	14	169	25	14	57	8	14
TOTAL	1369	315		1435	364		1559	352		1006	302		941	338		322	115	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# GRAND BEND WATER TREATMENT PLANT LAKE HURON



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### SOUTH PEEL (LAKEVIEW) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The South Peel (Lakeview) Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 450,000 and has a design capacity of 378 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and four distribution sites were taken on a monthly basis. The South Peel (Lakeview) Water Treatment Plant was sampled, for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the South Peel (Lakeview) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM SOUTH PEEL (LAKEVIEW) WTP

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE1			SITE2			SITE3			SITE4		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	47	47	100	48	6	12	48	14	29	35	9	25	40	10	25	52	9	17
CHEMISTRY (FLD)	36	36	100	71	71	100	141	141	100	115	115	100	119	119	100	129	129	100
CHEMISTRY (LAB)	223	202	90	224	167	74	392	364	92	328	291	88	327	279	85	390	351	90
METALS	243	146	60	243	126	51	471	244	51	392	226	57	393	237	60	471	275	58
CHLOROAROMATICS	156	0	0	156	0	0	156	0	0	130	0	0	130	0	0	156	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	297	0	0	295	0	0	295	0	0	248	0	0	247	0	0	297	0	0
PHENOLICS	12	1	8	12	1	8	1	0	0	1	0	0	1	0	0	1	0	0
SPECIFIC PESTICIDES	162	0	0	153	0	0	99	0	0	90	0	0	90	0	0	108	0	0
VOLATILES	337	1	0	339	50	14	339	50	14	281	41	14	282	43	15	338	49	14
ITAL	1576	433		1604	421		1942	813		1620	682		1629	688		1942	813	

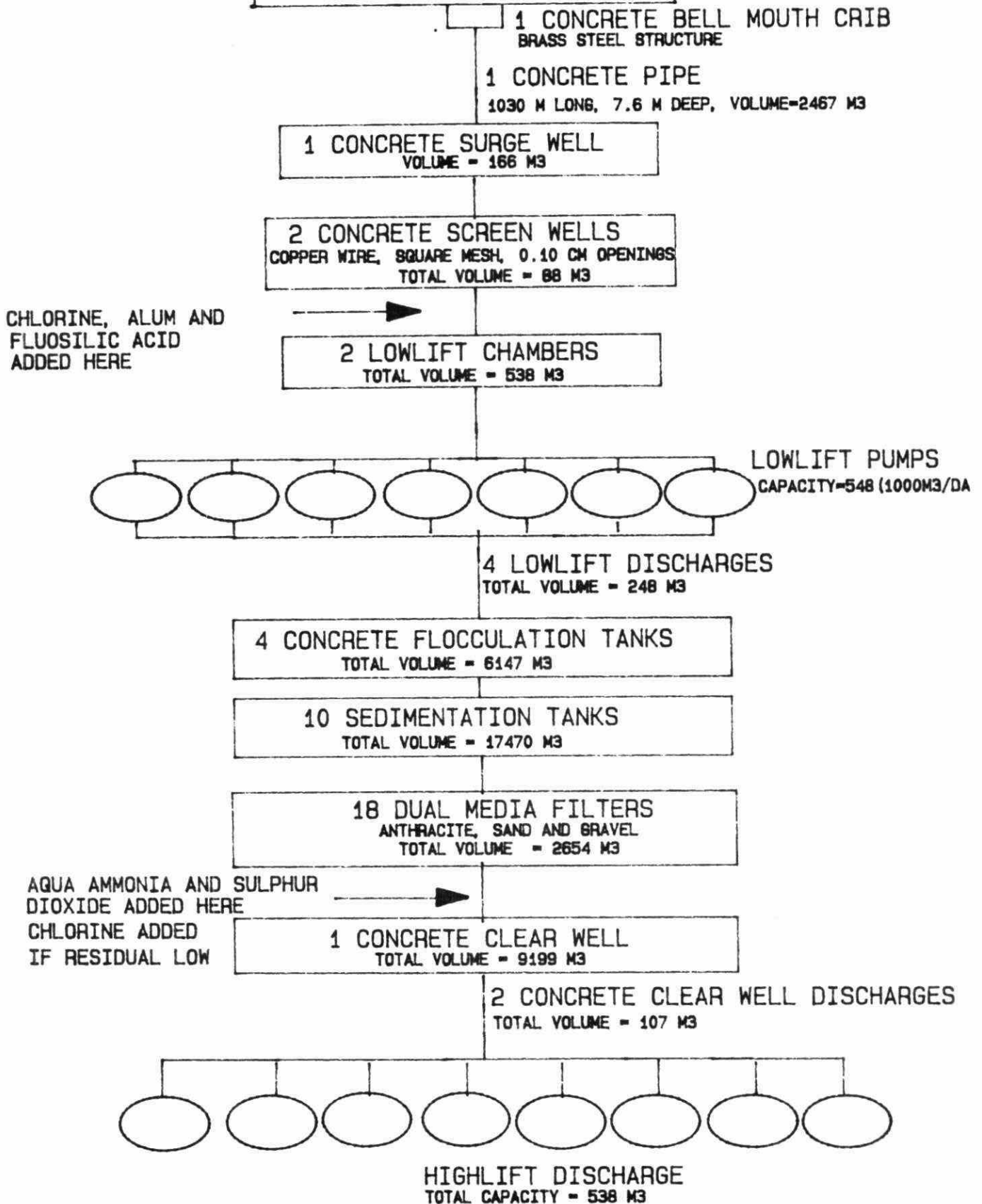
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

SOUTH PEEL (LAKEVIEW) WATER TREATMENT PLANT  
LAKE ONTARIO



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### LAMBTON AREA (SARNIA) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Lambton Area (Sarnia) Water Treatment Plant is a direct filtration plant which treats water from Lake Huron as it enters the St. Clair River. The process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant serves a population of approximately 88,000 people and has a design capacity of 189 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 11 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Due to the sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water, in terms of the limited DWSP bacteriological examination the water was of good quality.

On two occasions the Laboratory Turbidity exceeded the Ontario Drinking Water Objective (ODWO) of 1.0 Formazin Turbidity Unit (FTU). The March treated sample contained a Turbidity of 3.10 FTU and the May sample contained a value of 1.29 FTU. All other Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Lambton Area (Sarnia) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM LAMBTON AREA (SARNIA) WTP

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	31	19	61	42	8	19	34	5	14	35	9	25
CHEMISTRY (FLD)	28	27	96	65	65	100	96	96	100	106	106	100
CHEMISTRY (LAB)	169	130	76	207	140	67	277	211	76	294	222	75
METALS	170	76	44	222	97	43	335	158	47	354	161	45
CHLOROAROMATICS	130	0	0	143	1	0	78	0	0	104	0	0
CHLOROPHENOLS	6	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	246	0	0	270	0	0	156	0	0	200	1	0
PHENOLICS	10	2	20	11	2	18	1	0	0	1	0	0
SPECIFIC PESTICIDES	137	0	0	144	0	0	80	0	0	80	1	1
VOLATILES	253	4	1	308	44	14	254	38	14	253	37	14
TOTAL	1231	258		1475	357		1311	508		1427	537	

THE HEALTH RELATED ODWO FOR TURBIDITY WAS EXCEEDED TWICE IN THE TREATED WATER. NO OTHER HEALTH RELATED ODWOS WERE EXCEEDED

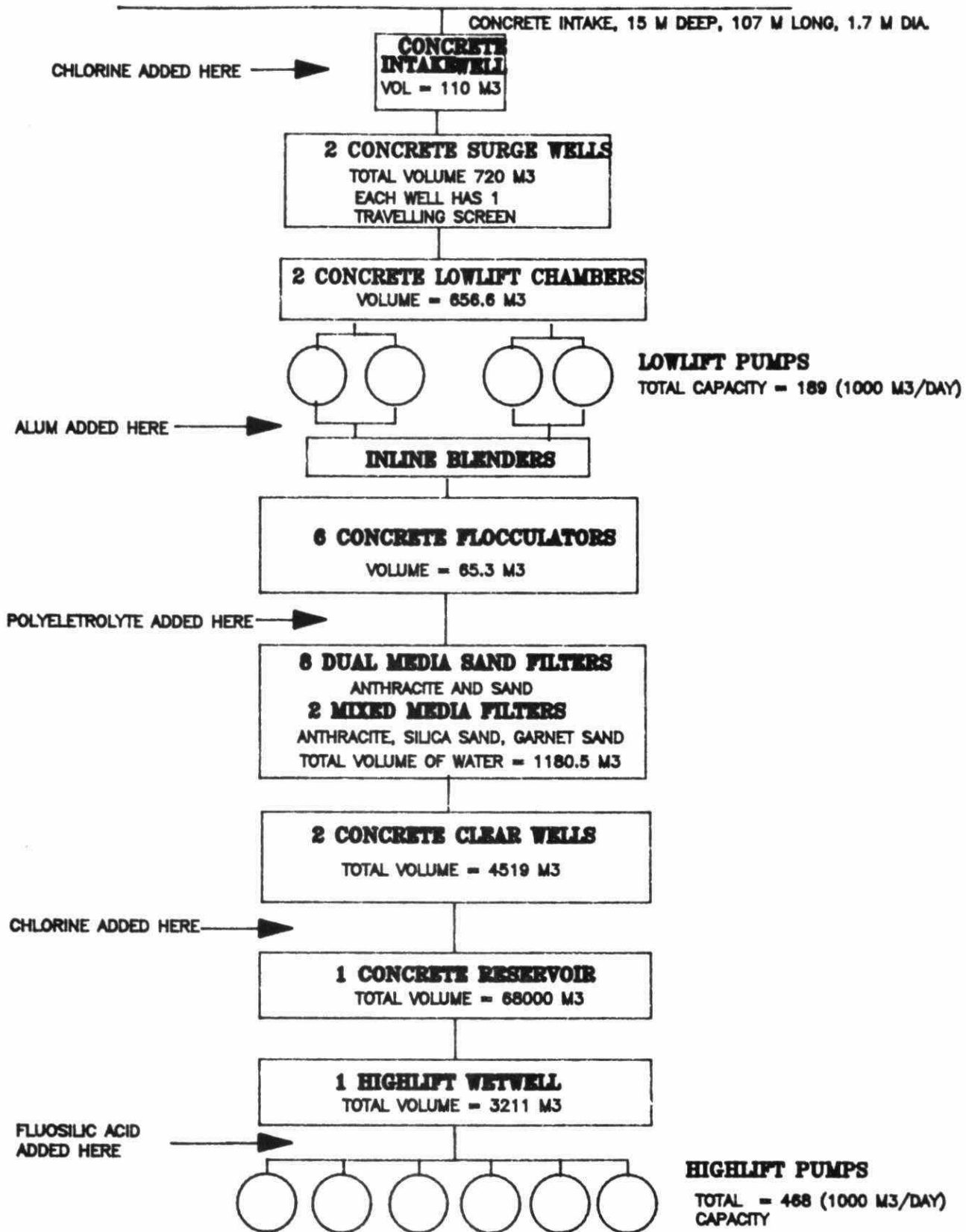
A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# FIGURE 2

## LAMBTON AREA (SARNIA) WATER TREATMENT PLANT

ST. CLAIR RIVER



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### LORNE PARK WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Lorne Park Water Treatment Plant in Mississauga is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant along with the Lakeview plant serves a population of approximately 450,000 and has a design capacity of 227 x 1000m<sup>3</sup>/day.

Water samples from the raw and treated water at the plant were taken in June and November. The Lorne Park Water Treatment Plant was sampled for approximately 160 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polyaromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency, the bacteriological quality of the water could not be fully evaluated. Routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority.

Inorganic and Physical parameters were below respective health related ODWOs.

Of a total of approximately 110 Organic parameters tested for, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Lorne Park Water Treatment Plant produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      LORNE PARK WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	8	100	8	2	25
CHEMISTRY (FLD)	6	6	100	12	12	100
CHEMISTRY (LAB)	38	31	81	38	26	68
METALS	40	21	52	40	19	47
CHLOROAROMATICS	26	0	0	26	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	17	0	0	17	0	0
PESTICIDES & PCB	50	0	0	50	0	0
PHENOLICS	2	0	0	2	0	0
SPECIFIC PESTICIDES	71	0	0	71	0	0
VOLATILES	56	0	0	56	8	14
TOTAL	326	66		332	67	

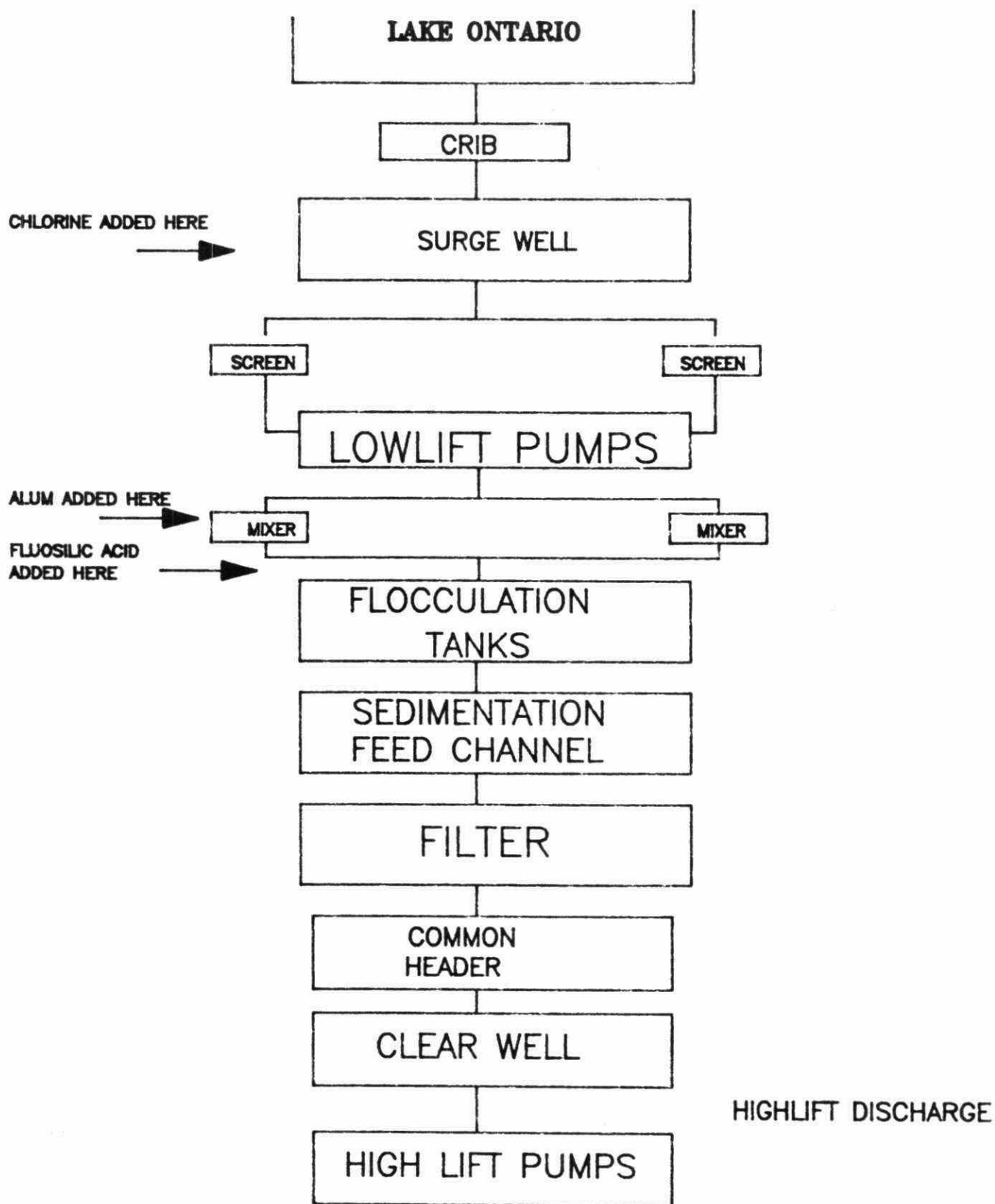
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# LORNE PARK WATER TREATMENT PLANT



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
MITCHELL'S BAY WATER TREATMENT PLANT  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Mitchell's Bay Water Treatment Plant is a conventional treatment plant which treats water from Lake St. Clair via a dredged channel under the lake. The treatment process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of 350 people and has a design capacity of  $1.1 \times 1000\text{m}^3/\text{day}$ .

Raw and treated water samples were taken in June and November and were analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency the bacteriological quality of water could not be evaluated. Routine bacteriological monitoring as recommended in the ODWOS is carried out by the operating authority.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were all below applicable health related ODWOS.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Mitchell's Bay Water Treatment Plant produced good quality water at the plant.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      MITCHELL'S BAY WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

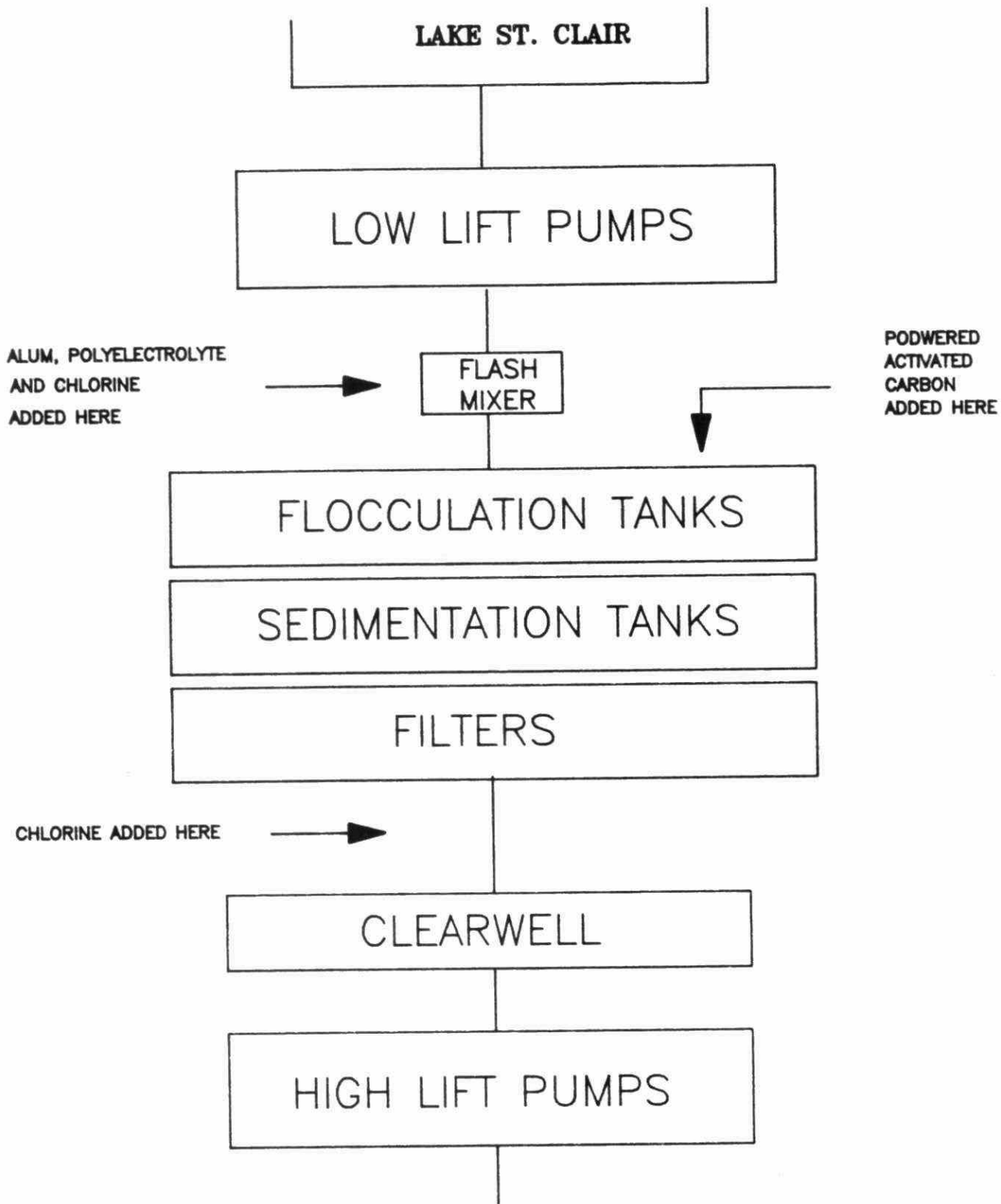
SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	6	75	8	0	0
CHEMISTRY (FLD)	6	6	100	11	11	100
CHEMISTRY (LAB)	38	32	84	38	25	65
METALS	40	22	55	40	23	57
CHLOROAROMATICS	13	0	0	13	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	0	0	0	0	0	0
PESTICIDES & PCB	28	0	0	28	0	0
PHENOLICS	2	0	0	2	0	0
SPECIFIC PESTICIDES	59	0	0	59	0	0
VOLATILES	56	0	0	56	8	14
TOTAL	262	66		267	67	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2  
MITCHELL'S BAY WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### NIAGARA FALLS WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Niagara Falls Water Treatment Plant is a conventional treatment plant which treats water from the Niagara River via the Welland River. The treatment process consists of screening, coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of approximately 69,000 people and has a design capacity of 146 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and three distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Fecal Coliforms were present in the July distribution system Site 2 water sample and Coliforms were present in the July, September and October Site 2 water samples. The District Officer was notified. Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined on the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination, the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Niagara Falls Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      NIAGARA FALLS WATER TREATMENT PLANT

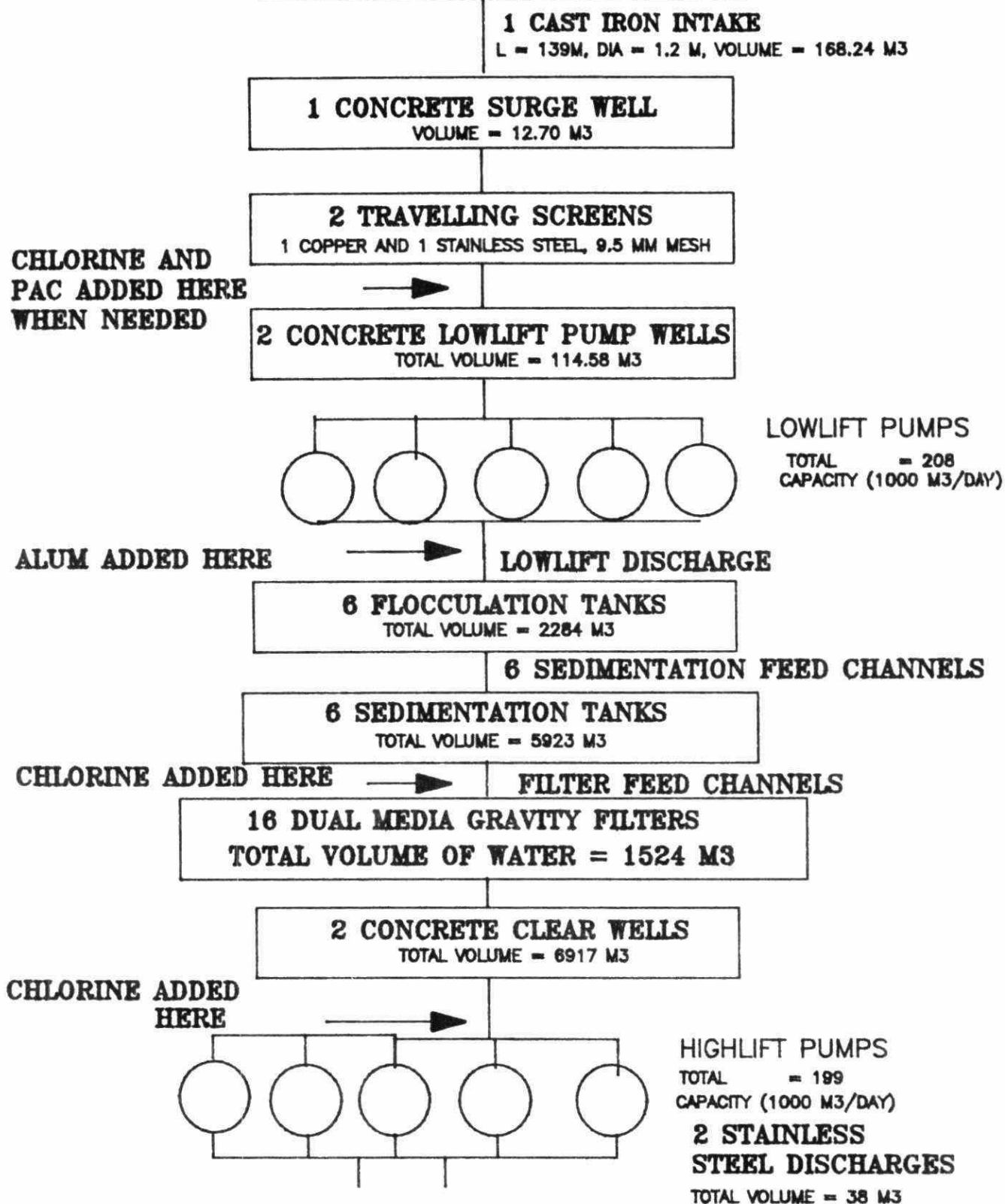
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2			SITE 3		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	48	47	97	48	13	27	43	7	16	55	26	47	45	7	15
CHEMISTRY (FLD)	36	36	100	71	71	100	117	117	100	67	67	100	105	105	100
CHEMISTRY (LAB)	225	180	80	225	159	70	326	268	82	327	281	85	327	270	82
METALS	242	123	50	243	113	46	394	214	54	392	225	57	393	206	52
CHLOROAROMATICS	143	0	0	156	1	0	130	0	0	130	0	0	130	1	0
CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.	.	.	.
PESTICIDES & PCB	275	0	0	297	0	0	250	0	0	247	0	0	247	0	0
PHENOLICS	11	0	0	11	1	9	1	0	0	1	0	0	1	0	0
SPECIFIC PESTICIDES	161	0	0	155	0	0	99	0	0	90	0	0	90	0	0
VOLATILES	339	2	0	339	47	13	311	45	14	282	40	14	283	40	14
TOTAL	1543	388		1602	405		1671	651		1591	639		1621	629	

FECAL COLIFORMS WERE PRESENT IN ONE DISTRIBUTED WATER, COLIFORMS WERE DETECTED ON TWO OTHER OCCASIONS AT THE SAME SITE.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

**FIGURE 2**  
**NIAGARA FALLS WATER TREATMENT PLANT**  
 NIAGARA RIVER VIA  
 WELLAND RIVER



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### NORTH BAY WATER SUPPLY 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The North Bay Water Treatment Plant is a pumping station that disinfects and fluoridates water from Trout Lake before distribution. This plant serves a population of approximately 50,000 people and has a design capacity of 24 x 1000m<sup>3</sup>/day.

Water samples from two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters beginning in March. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Phenolics, Polynuclear Aromatic Hydrocarbons and Chlorophenols were not analysed for.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. Coliforms were present once at one distribution site. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the distributed water from the North Bay Water Treatment Plant was a good quality water.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY (TROUT LAKE) W.T.P.

## SUMMARY TABLE BY SCAN (1987)

SCAN	SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	30	8	26	38	15	39
CHEMISTRY (FLD)	89	89	100	89	89	100
CHEMISTRY (LAB)	291	262	90	289	258	89
METALS	317	161	50	351	155	44
CHLOROAROMATICS	104	0	0	104	0	0
PESTICIDES & PCB	203	0	0	203	0	0
SPECIFIC PESTICIDES	81	0	0	81	0	0
VOLATILES	252	29	11	252	32	12
TOTAL	1367	549		1407	549	

COLIFORMS WERE PRESENT ONCE IN THE DISTRIBUTION SYSTEM. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### OSHAWA WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Oshawa Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 244,000 people and has a design capacity of 136 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Oshawa Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      OSHAWA WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

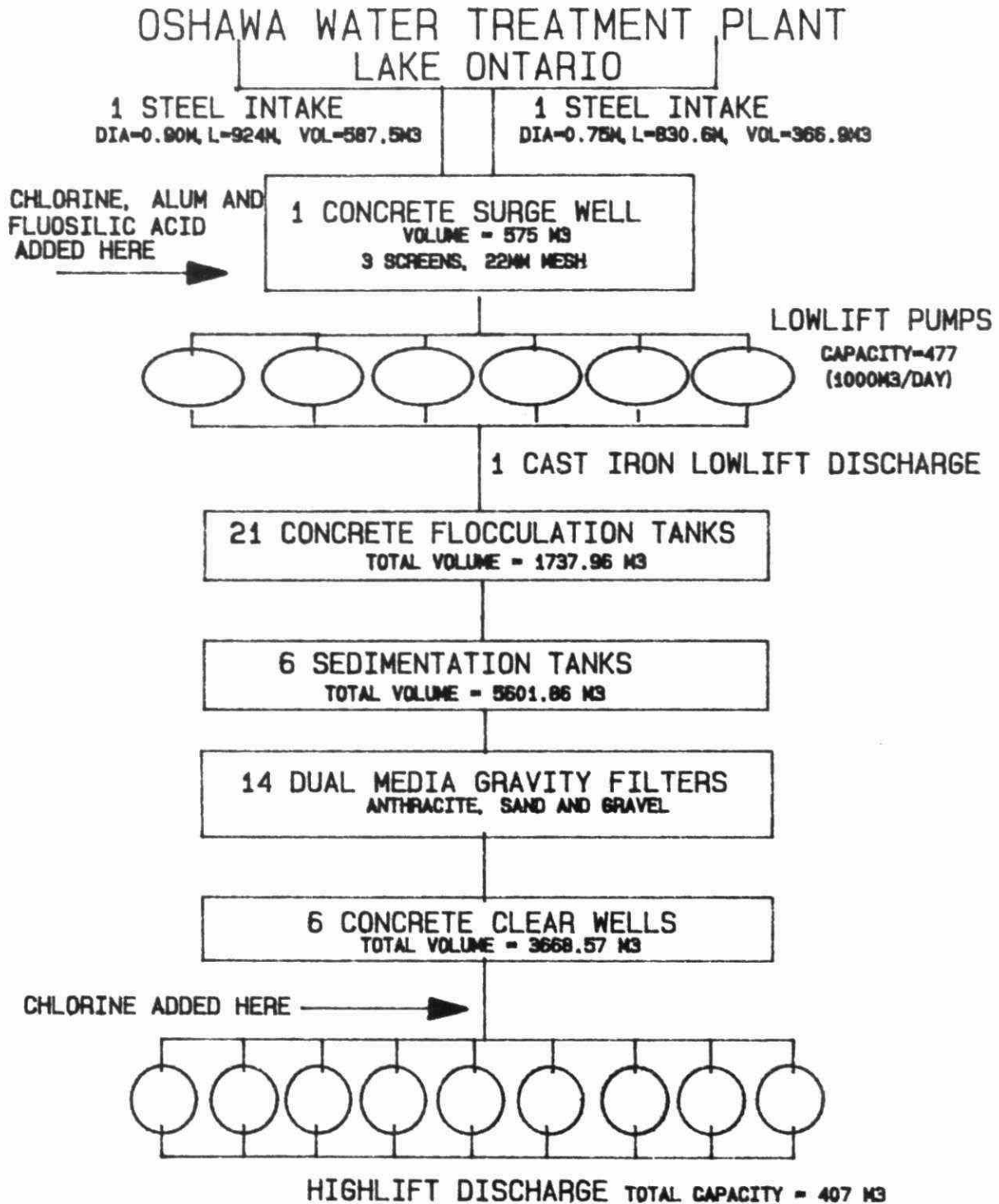
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	32	29	90	37	10	27	41	10	24	49	10	20
CHEMISTRY (FLD)	24	24	100	48	48	100	106	106	100	130	130	100
CHEMISTRY (LAB)	152	126	82	152	105	69	295	260	88	361	299	82
METALS	160	83	51	160	76	47	353	190	53	431	234	54
CHLOROAROMATICS	104	0	0	104	0	0	117	0	0	143	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	200	0	0	200	0	0	221	0	0	273	0	0
PHENOLICS	8	0	0	8	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	125	0	0	125	0	0	72	0	0	99	0	0
VOLATILES	224	1	0	224	33	14	252	37	14	308	45	14
TOTAL	1092	263		1121	272		1457	603		1794	718	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM OTTAWA (BRITANNIA) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Ottawa (Britannia) Water Treatment Plant is a conventional treatment plant which treats water from the Ottawa River. The Process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Lemieux Island plant, serves a population of approximately 515,000 people and has a design capacity of 247 x 1000m<sup>3</sup>/day.

Water samples at the Ottawa (Britannia) Water Treatment Plant raw and treated sites plus two distribution system sites were taken on a monthly basis and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

The ODWO for Turbidity was exceeded in the treated water in January and September. The District Officer was notified. All other Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Ottawa (Britannia) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      BRITANNIA WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN		TREATED			SITE 1			SITE 2					
		TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
128	BACTERIOLOGICAL	47	47	100	48	8	16	48	10	20	44	15	34
	CHEMISTRY (FLD)	38	38	100	72	72	100	137	137	100	128	128	100
	CHEMISTRY (LAB)	224	190	84	224	189	84	381	331	86	377	316	83
	METALS	243	124	51	243	123	50	455	212	46	471	227	48
	CHLOROAROMATICS	156	0	0	156	0	0	143	0	0	156	0	0
	CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.
	PAH	51	0	0	68	0	0	.	.	.	.	.	.
	PESTICIDES & PCB	297	0	0	297	0	0	273	0	0	295	0	0
	PHENOLICS	11	2	18	11	2	18	.	.	.	.	.	.
	SPECIFIC PESTICIDES	162	0	0	135	0	0	99	0	0	99	0	0
VOLATILES	337	7	2	337	37	10	338	37	10	339	37	10	
TOTAL		1578	408		1597	431		1874	727		1909	723	

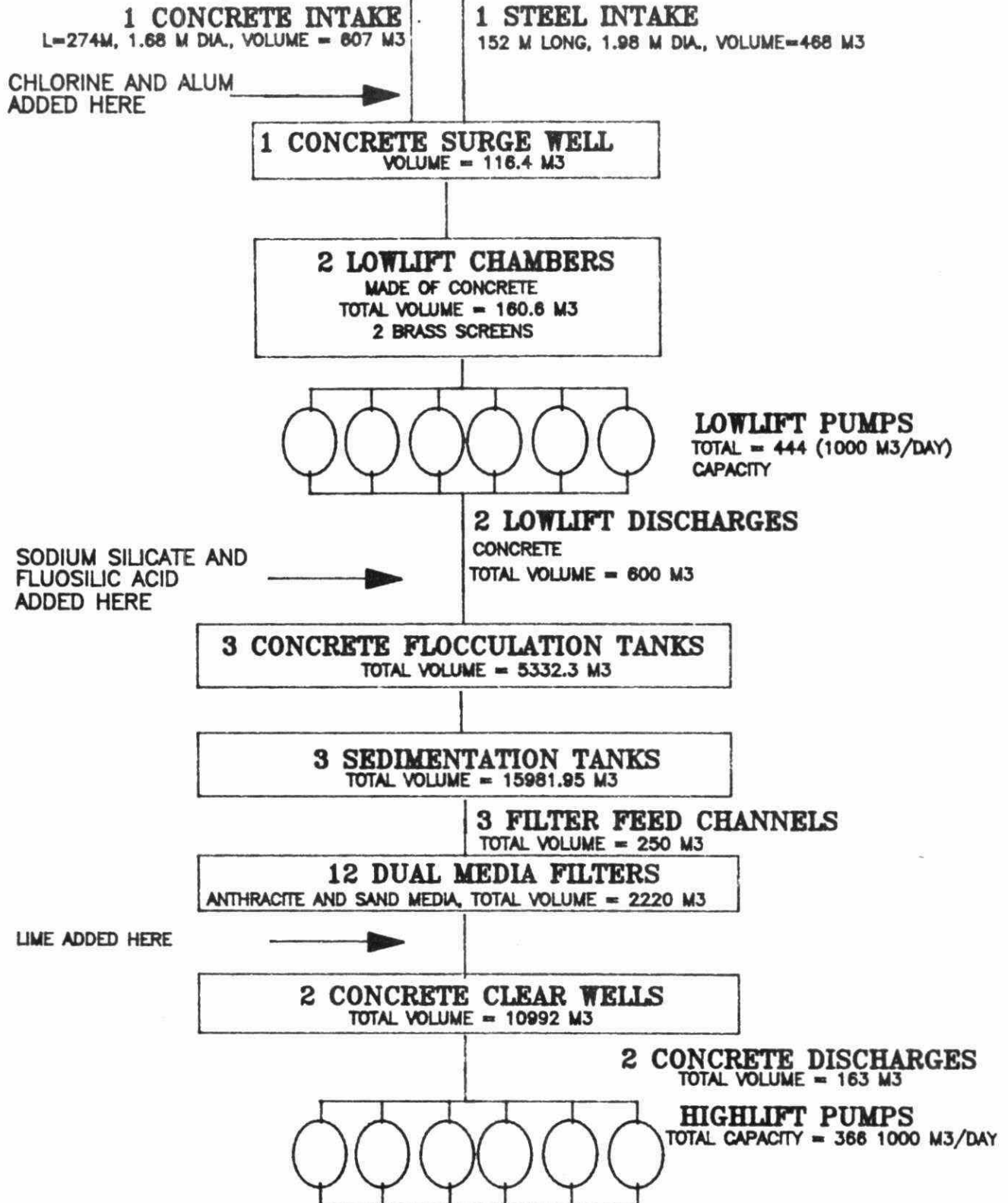
THE ODWO FOR TURBIDITY WAS EXCEEDED TWICE, NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# OTTAWA (BRITANNIA) WATER TREATMENT PLANT

## OTTAWA RIVER



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Ottawa (Lemieux Island) Water Treatment Plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Britannia plant, serves a population of approximately 515,000 people and has a design capacity of 299 x 1000m<sup>3</sup>/day.

Samples from the Ottawa (Lemieux Island) Water Treatment Plant raw and treated water plus two distribution system sites were taken on a monthly basis and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Fecal Coliforms were present in the October distribution system Site 2 sample. The District Officer was notified. Due to the sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs except on one occasion when the ODWO for Turbidity was exceeded in the treated water. The District Officer was notified.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Ottawa (Lemieux Island) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

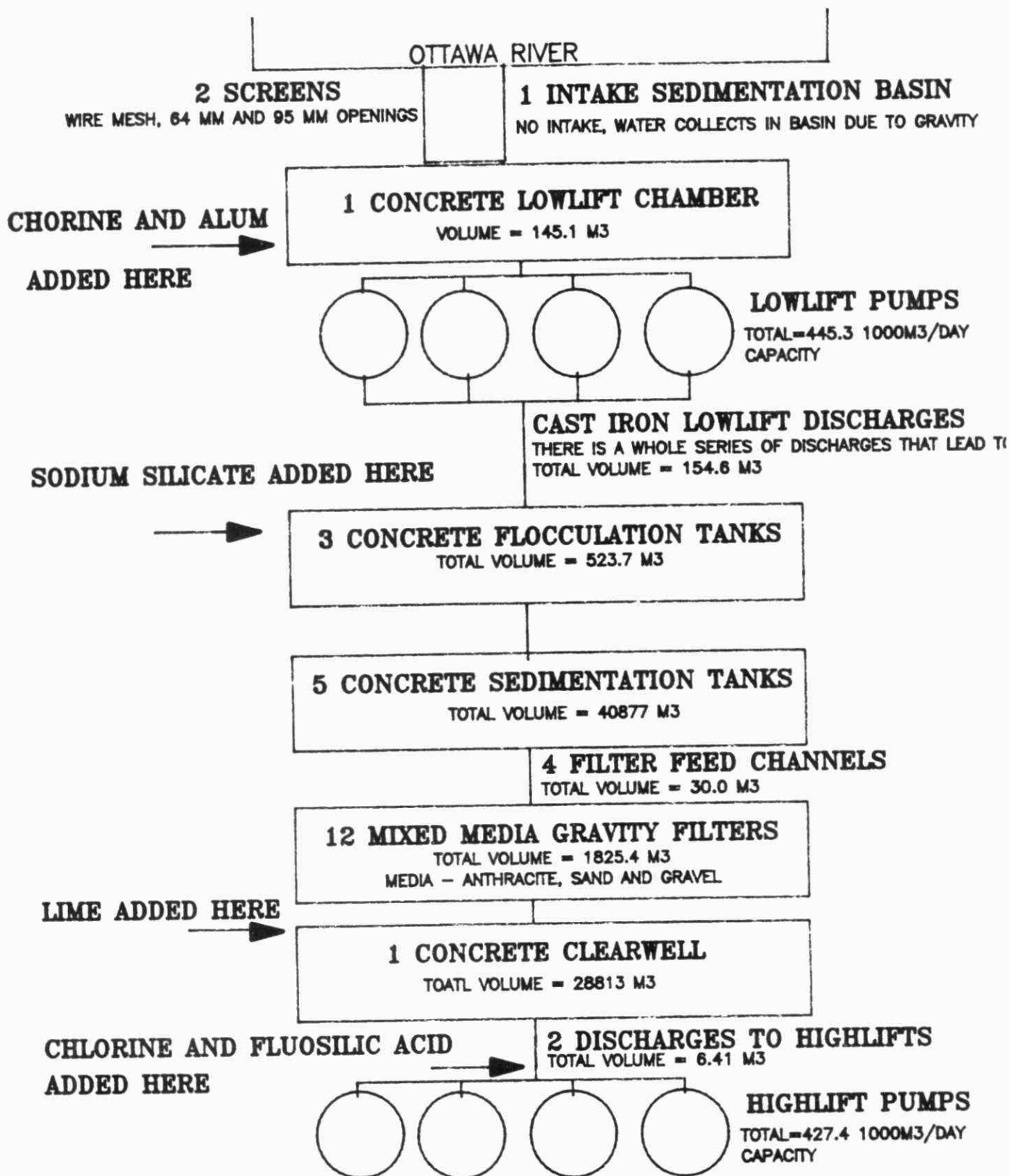
	SCAN	RAW			TREATED			SITE 1			SITE 2		
		TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
131	BACTERIOLOGICAL	45	45	100	48	10	20	48	15	31	48	19	39
	CHEMISTRY (FLD)	38	38	100	72	72	100	136	136	100	138	138	100
	CHEMISTRY (LAB)	225	200	88	225	187	83	393	359	91	393	347	88
	METALS	243	122	50	243	119	48	471	243	51	469	220	46
	CHLOROAROMATICS	117	0	0	143	0	0	156	1	0	156	1	0
	CHLOROPHENOLS	12	0	0	12	1	8	.	.	.	.	.	.
	PAH	68	0	0	68	0	0	.	.	.	.	.	.
	PESTICIDES & PCB	231	0	0	275	0	0	297	0	0	297	0	0
	PHENOLICS	12	1	8	12	1	8	.	.	.	.	.	.
	SPECIFIC PESTICIDES	162	0	0	162	0	0	108	0	0	108	0	0
	VOLATILES	337	5	1	336	38	11	337	39	11	337	36	10
TOTAL		1490	411		1596	428		1946	793		1946	761	

FECAL COLIFORMS WERE PRESENT IN ONE DISTRIBUTED WATER, THE ODWO FOR TURBIDITY WAS EXCEEDED IN ONE TREATED WATER

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

# FIGURE 2

## OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### PETERBOROUGH WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Peterborough Water Treatment Plant is a conventional treatment plant which treats water from the Otonabee River. The treatment process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of 61,500 people and has a design capacity of 104 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters. The distribution system was sampled 13 times during 1987 and the raw and treated water was sampled 8 times. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of drinking water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Peterborough Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      PETERBOROUGH WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

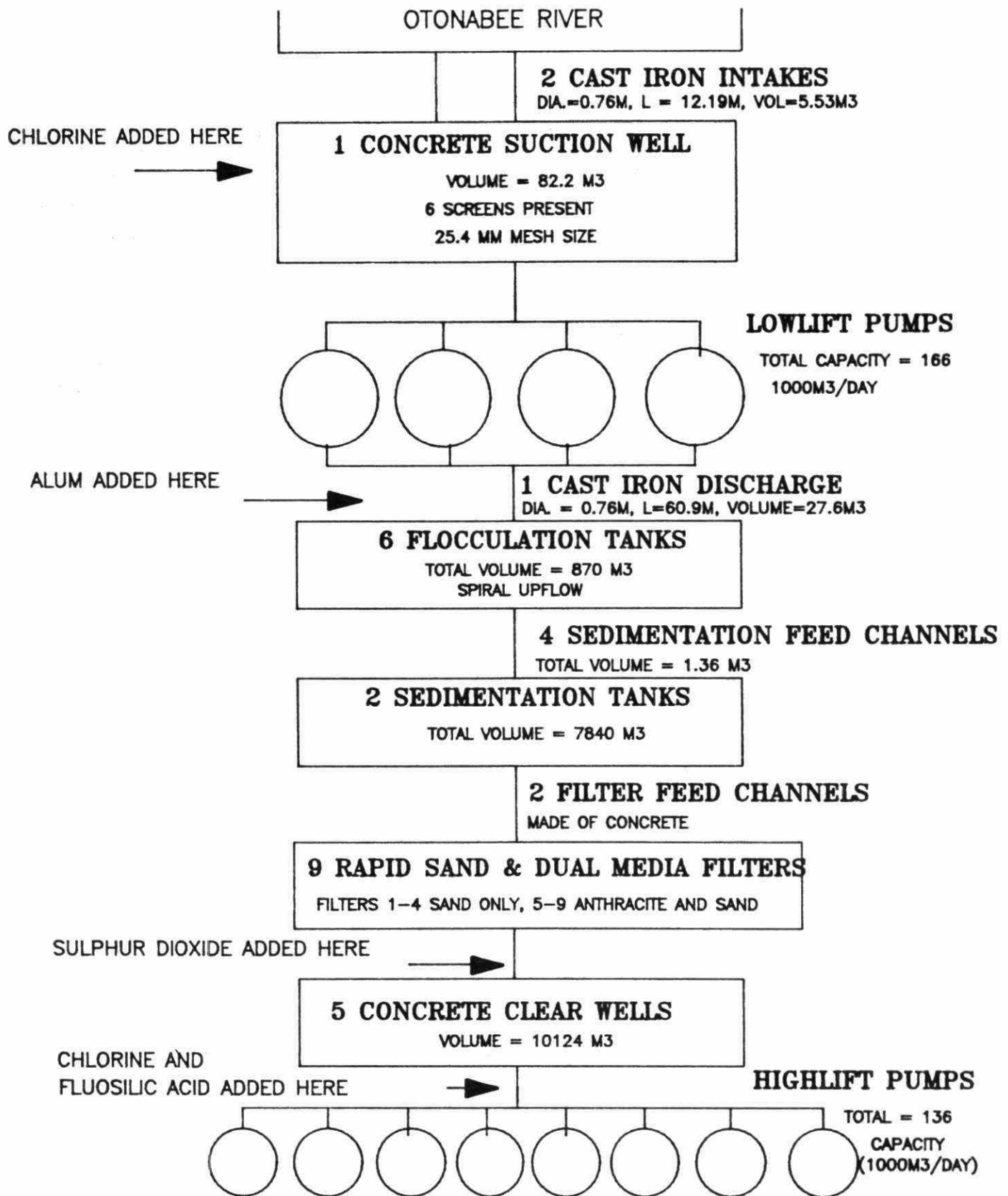
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	30	30	100	32	9	28	49	12	24	45	9	20
CHEMISTRY (FLD)	21	21	100	45	45	100	150	150	100	131	131	100
CHEMISTRY (LAB)	152	128	84	151	115	76	423	376	88	359	321	89
METALS	159	76	47	159	60	37	492	233	47	433	202	46
CHLOROAROMATICS	78	0	0	78	1	1	116	0	0	130	0	0
CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	154	0	0	156	0	0	233	0	0	247	0	0
PHENOLICS	7	0	0	8	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	115	0	0	125	0	0	117	1	0	90	0	0
VOLATILES	224	0	0	224	25	11	366	44	12	311	35	11
TOTAL	1003	255		1035	255		1946	816		1746	698	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

**FIGURE 2**  
**PETERBOROUGH WATER TREATMENT PLANT**



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM PORT DOVER WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Port Dover Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The Port Dover plant has a design capacity of 11.4 X 1000 M3/day. The Doan's Hollow Infiltration Pond is used as an additional source and once chlorinated makes up approximately 20 to 30 percent of the water supplied to Port Dover. Both sources supply a population of approximately 4,682 people.

Water samples from the plant, raw and treated, Doan's Hollow, raw and treated and two distribution system sites were taken on a monthly basis. The Port Dover Water Treatment Plant was sampled for 160 parameters 9 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Three treated waters from Doan's Hollow were positive for Total Coliform, Fecal Coliform and E. coli. Two other water samples had Coliform. The District Officer was notified on all five occasions. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Port Dover Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM DOANS HOLLOW INFILT. POND PORT DOVER

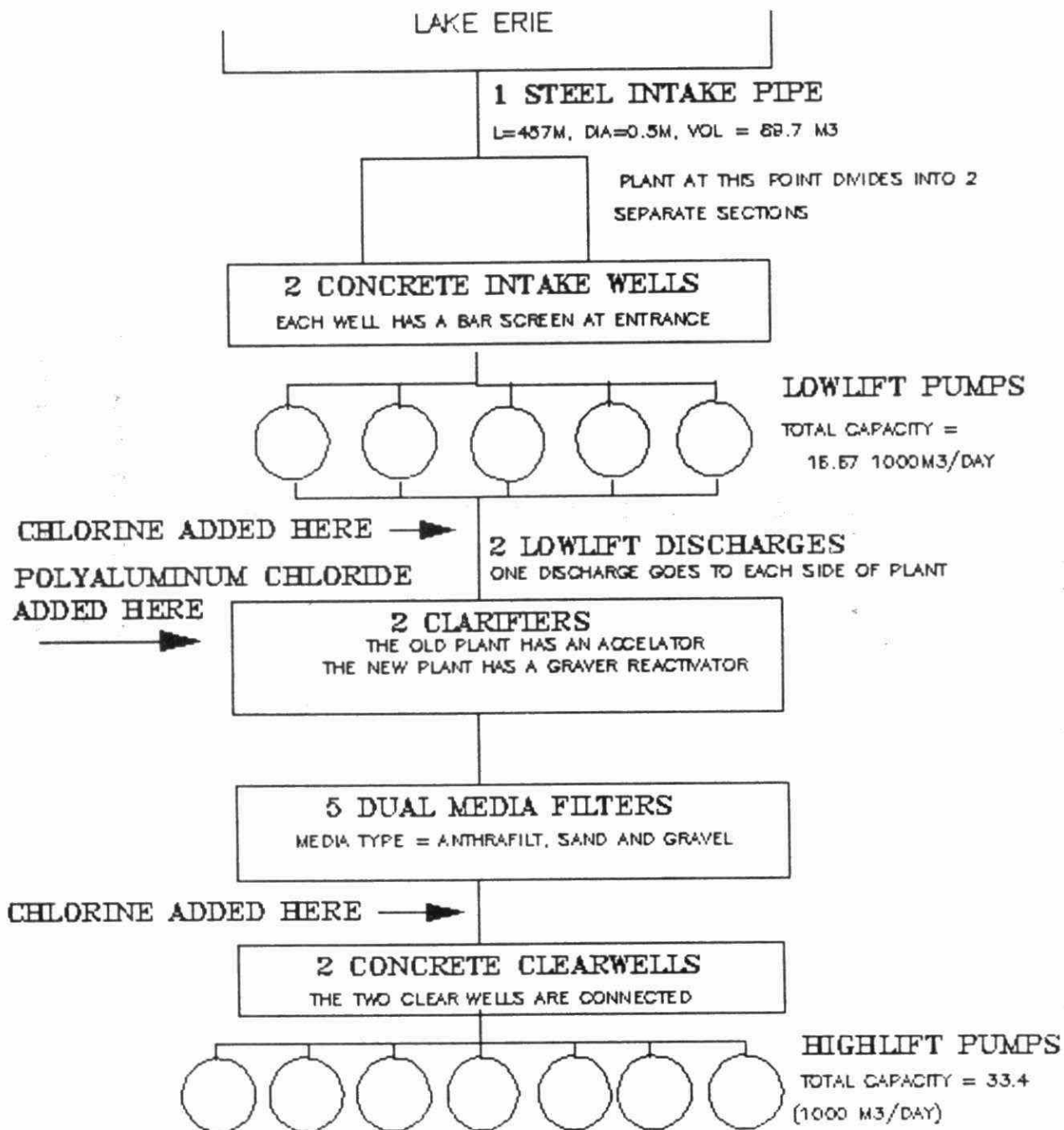
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
137 BACTERIOLOGICAL	26	26	100	49	32	65
CHEMISTRY (FLD)	23	23	100	46	46	100
CHEMISTRY (LAB)	150	126	84	151	115	76
METALS	140	63	45	160	86	53
CHLOROAROMATICS	78	0	0	91	0	0
CHLOROPHENOLS	12	0	0	6	0	0
PAH	51	0	0	68	0	0
PESTICIDES & PCB	155	0	0	178	0	0
PHENOLICS	6	2	33	6	0	0
SPECIFIC PESTICIDES	105	0	0	99	0	0
VOLATILES	195	0	0	223	33	14
TOTAL	941	240		1077	312	

COLIFORMS WERE PRESENT IN FIVE TREATED WATER SAMPLES. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2  
PORT DOVER WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM PORT STANLEY WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Port Stanley Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 2,100 and has a design capacity of  $3.27 \times 1000\text{m}^3/\text{day}$ .

Water samples from the raw and treated water at the plant were taken in June and November. The Port Stanley Water Treatment Plant was sampled for approximately 160 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency, the bacteriological quality of water could not be evaluated; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters were below any health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Port Stanley Water Treatment Plant produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      PORT STANLEY WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	8	100	8	2	25
CHEMISTRY (FLD)	6	6	100	9	9	100
CHEMISTRY (LAB)	38	34	89	38	26	68
METALS	40	27	67	40	21	52
CHLOROAROMATICS	26	0	0	13	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	17	0	0	0	0	0
PESTICIDES & PCB	50	0	0	28	0	0
PHENOLICS	2	0	0	2	0	0
SPECIFIC PESTICIDES	72	0	0	60	0	0
VOLATILES	56	0	0	56	8	14
TOTAL	327	75		266	66	

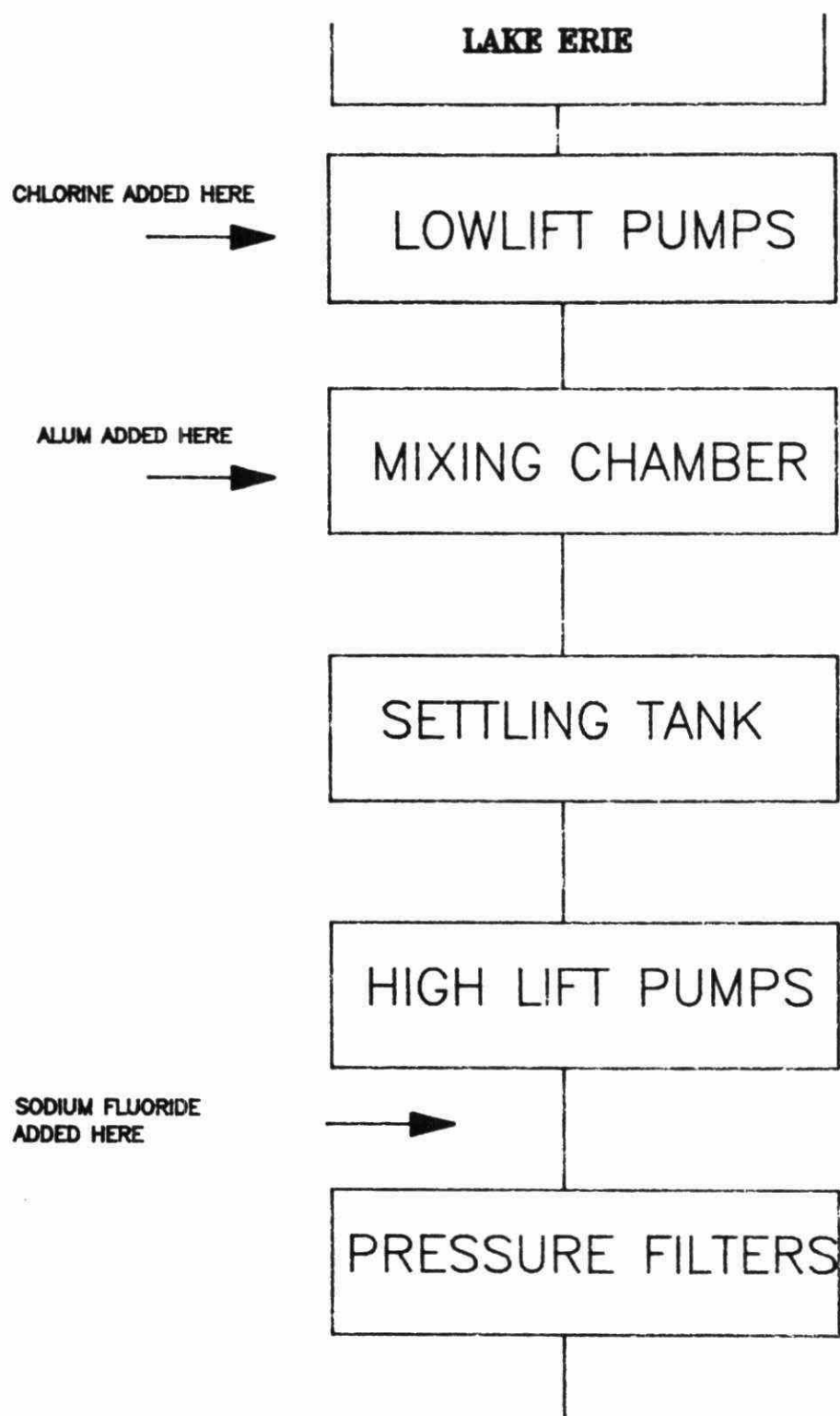
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# PORT STANLEY WATER TREATMENT PLANT



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM

SAULT STE MARIE WELLS AND WATER TREATMENT PLANT  
ANNUAL REPORT 1987

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Sault Ste Marie Water Treatment Plant is a direct filtration plant which treats water from Lake Superior. The treatment process consists of coagulation, flocculation, filtration and disinfection. Water is also obtained from two wells draining water from separate aquifers at which the only treatment applied is disinfection. The plant and two wells serve a population of 85,000 people. The plant has a design capacity of 40 x 1000m<sup>3</sup>/day.

Water samples of the raw and treated water from the plant, raw and treated water from each of the aquifers and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 9 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination, the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Sault Ste Marie Water Supply was of good quality water and this was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM SAULT STE MARIE WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN 1987

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	36	22	61	36	4	11	40	10	25	32	8	25
CHEMISTRY (FLD)	26	26	100	44	44	100	64	64	100	48	48	100
CHEMISTRY (LAB)	170	101	59	170	114	67	297	253	85	264	193	73
METALS	180	73	40	180	65	36	351	212	60	276	155	56
CHLOROAROMATICS	117	0	0	117	0	0	104	0	0	104	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	222	0	0	223	0	0	199	0	0	200	0	0
PHENOLICS	8	0	0	8	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	125	0	0	119	0	0	63	0	0	72	0	0
VOLATILES	224	2	0	252	27	10	252	24	9	224	25	11
TOTAL	1171	224		1212	254		1370	563		1220	429	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM LORNA WELL SUPPLY SAULT STE MARIE

## SUMMARY TABLE BY SCAN 1987

144

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	32	11	34	36	9	25
CHEMISTRY (FLD)	18	18	100	36	36	100
CHEMISTRY (LAB)	171	127	74	170	129	75
METALS	180	101	56	180	100	55
CHLOROAROMATICS	117	0	0	117	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	51	0	0	51	0	0
PESTICIDES & PCB	224	0	0	225	0	0
PHENOLICS	9	0	0	9	0	0
SPECIFIC PESTICIDES	134	0	0	134	0	0
VOLATILES	224	2	0	252	11	4
TOTAL	1172	259		1222	285	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      STEELTON WELL SUPPLY SAULT STE MARIE

## SUMMARY TABLE BY SCAN 1987

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	39	12	30	36	9	25
CHEMISTRY (FLD)	19	19	100	37	37	100
CHEMISTRY (LAB)	190	118	62	170	122	71
METALS	200	86	43	161	72	44
CHLOROAROMATICS	117	0	0	104	0	0
CHLOROPHENOLS	18	0	0	12	0	0
PAH	68	0	0	51	0	0
PESTICIDES & PCB	226	0	0	203	0	0
PHENOLICS	10	0	0	9	0	0
SPECIFIC PESTICIDES	149	0	0	134	0	0
VOLATILES	223	1	0	251	3	1
TOTAL	1259	236		1168	243	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

**FIGURE 2**  
**SAULT STE MARIE WATER TREATMENT PLANT**

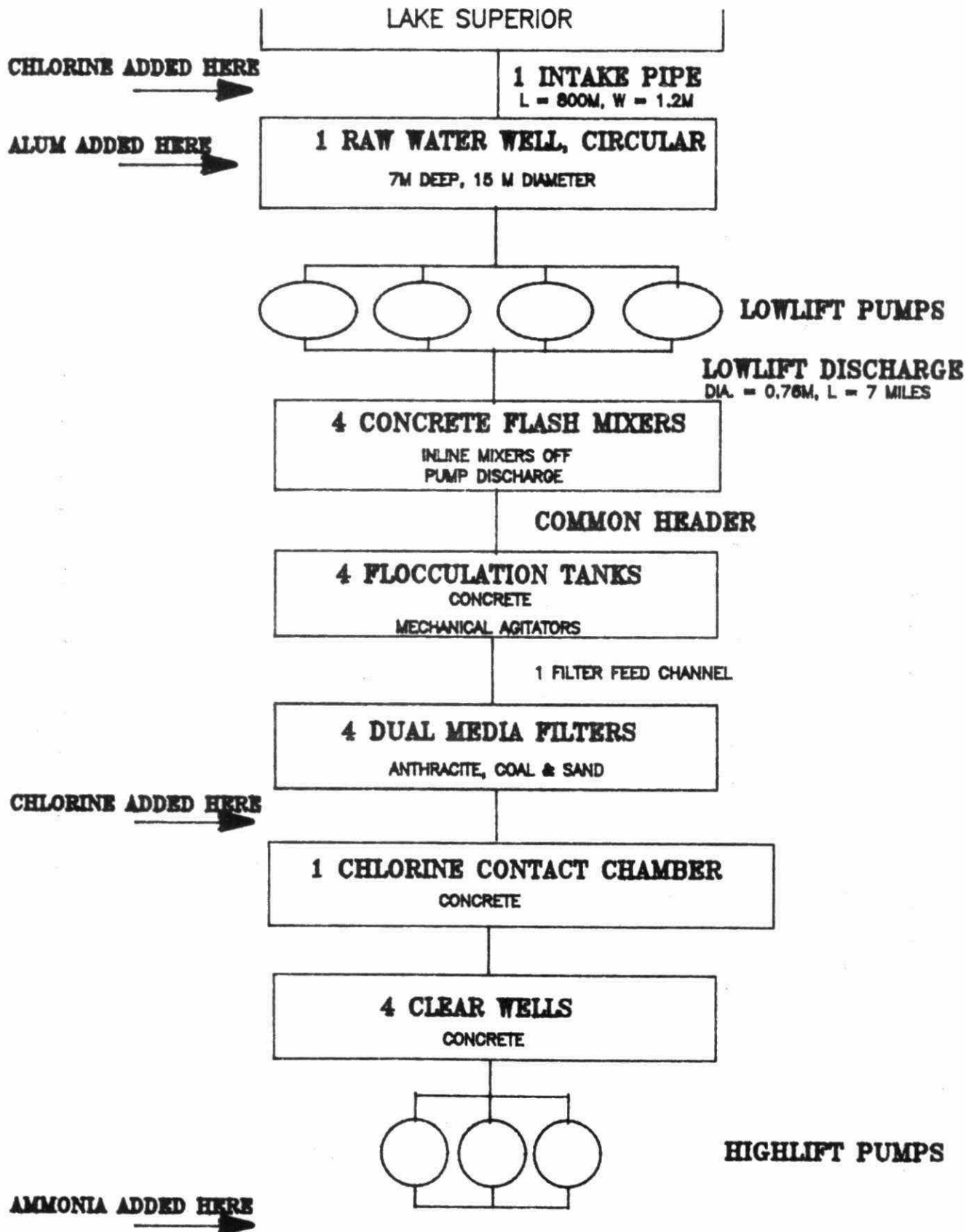
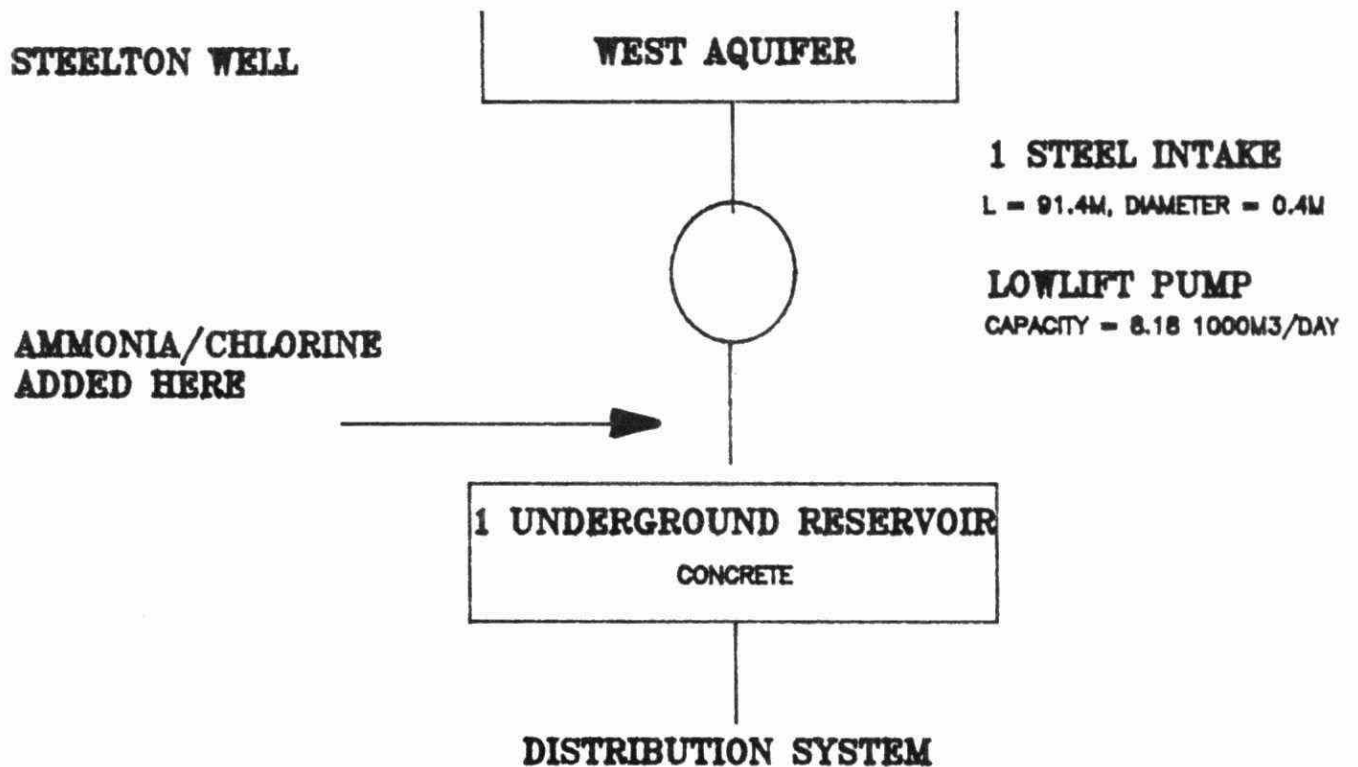
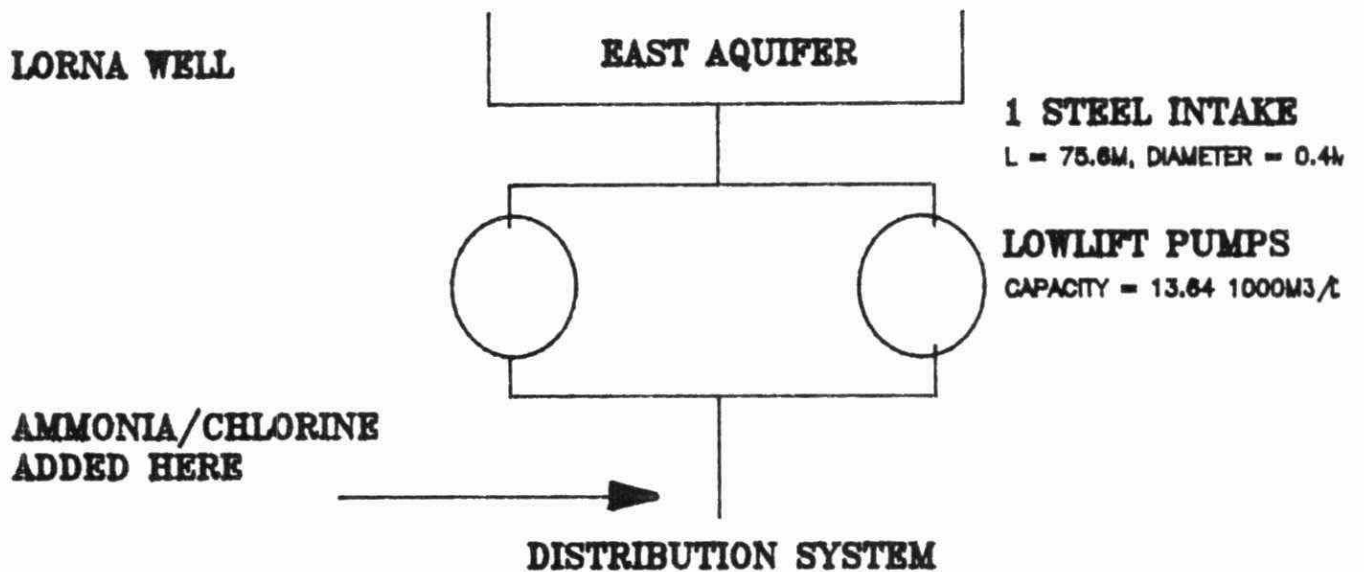


FIGURE 2

**SAULT STE MARIE AQUIFERS**



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
ST. CATHARINES WATER TREATMENT PLANT  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The St. Catharines Water Treatment Plant is a conventional treatment plant which treats water from Lake Erie via the Welland Canal. The treatment process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of approximately 148,300 people and has a design capacity of 191 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution system sites were taken on a monthly basis. Sampling at both distribution system sites was initiated in February 1987. The plant was incorporated onto the program in May when installation of sample lines was completed. The St. Catharines Water Treatment Plant was sampled for 160 parameters, 8 times during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Coliforms were present in one water sample from the treated and distribution system Site 1 and in two samples from Site 2. The District Officer was notified on all four occasions. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination, the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded any known health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the St. Catharines Water Treatment Plant produced good quality water at the plant that was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM ST. CATHARINES WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

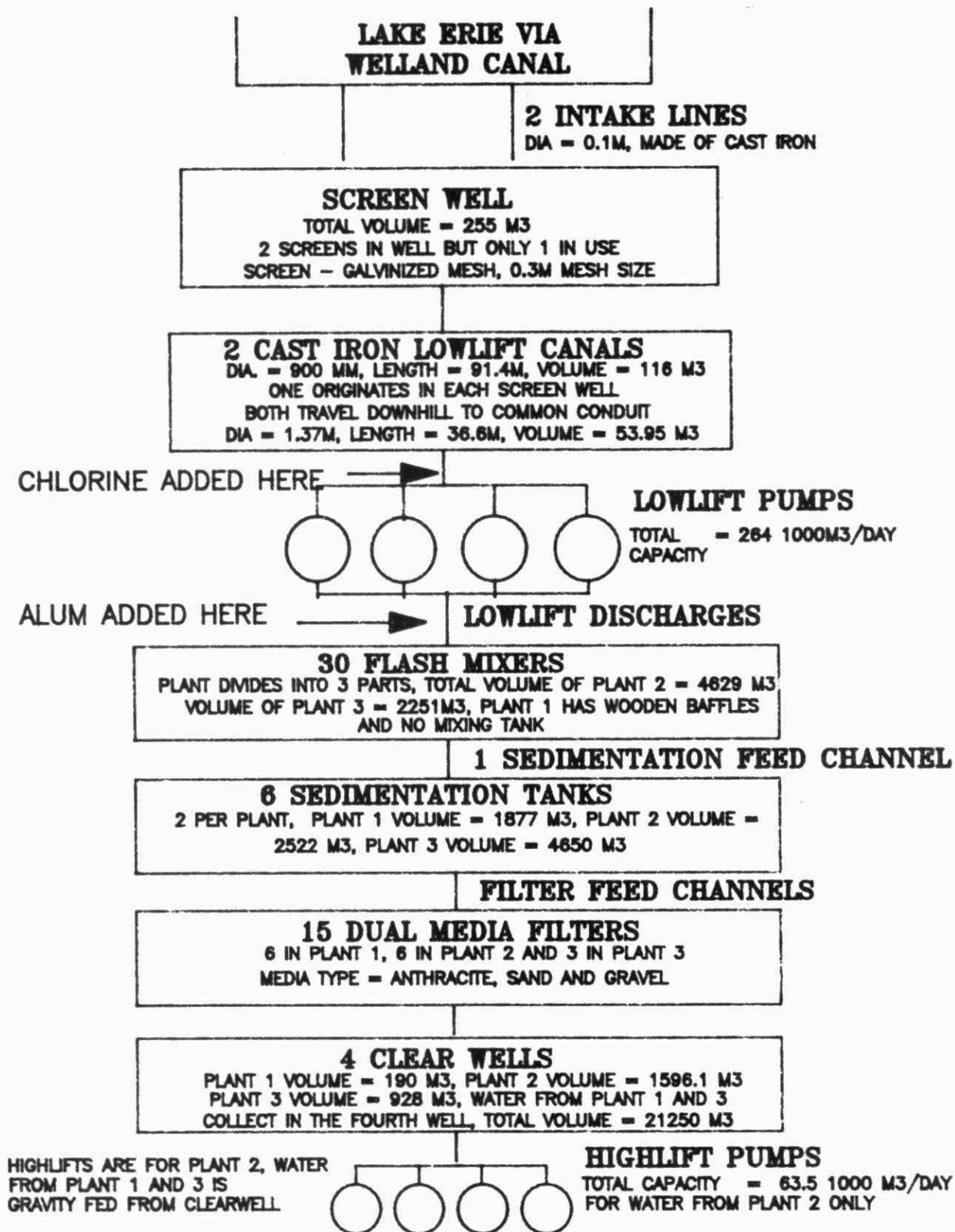
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	28	28	100	36	15	41	47	13	27	52	19	36
CHEMISTRY (FLD)	24	24	100	45	45	100	110	110	100	115	115	100
CHEMISTRY (LAB)	152	134	88	152	108	71	361	301	83	361	290	80
METALS	160	88	55	160	79	49	391	210	53	401	219	54
CHLOROAROMATICS	104	0	0	104	0	0	143	0	0	143	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	197	0	0	198	0	0	271	0	0	271	0	0
PHENOLICS	8	0	0	8	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	117	0	0	117	0	0	90	0	0	90	0	0
VOLATILES	196	0	0	224	32	14	310	46	14	280	41	14
TOTAL	1049	274		1107	279		1723	680		1713	684	

COLIFORMS WERE PRESENT IN ONE TREATED WATER AND THREE DISTRIBUTED WATERS NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

## ST. CATHARINES WATER TREATMENT PLANT



EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
STONEY POINT WATER TREATMENT PLANT  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Stoney Point Water Treatment Plant is a conventional treatment plant which treats water from Lake St. Clair. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of 3,500 and has a design capacity of 4.45 x 1000m<sup>3</sup>/day.

Raw and Treated water samples were analyzed for approximately 160 parameters in June and November. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to the sampling frequency, full evaluation of the bacteriological quality of water could not be made. Routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were all below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

For 1987 the DWSP sampling results indicated that the Stoney Point Water Treatment Plant produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM STONEY POINT WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	8	6	75	8	2	25
CHEMISTRY (FLD)	6	6	100	9	9	100
CHEMISTRY (LAB)	38	35	92	38	25	65
METALS	40	20	50	40	18	45
CHLOROAROMATICS	26	0	0	26	0	0
CHLOROPHENOLS	12	0	0	12	0	0
PAH	17	0	0	17	0	0
PESTICIDES & PCB	49	0	0	50	0	0
PHENOLICS	2	0	0	2	0	0
SPECIFIC PESTICIDES	71	0	0	71	0	0
VOLATILES	28	0	0	56	8	14
TOTAL	297	67		329	62	

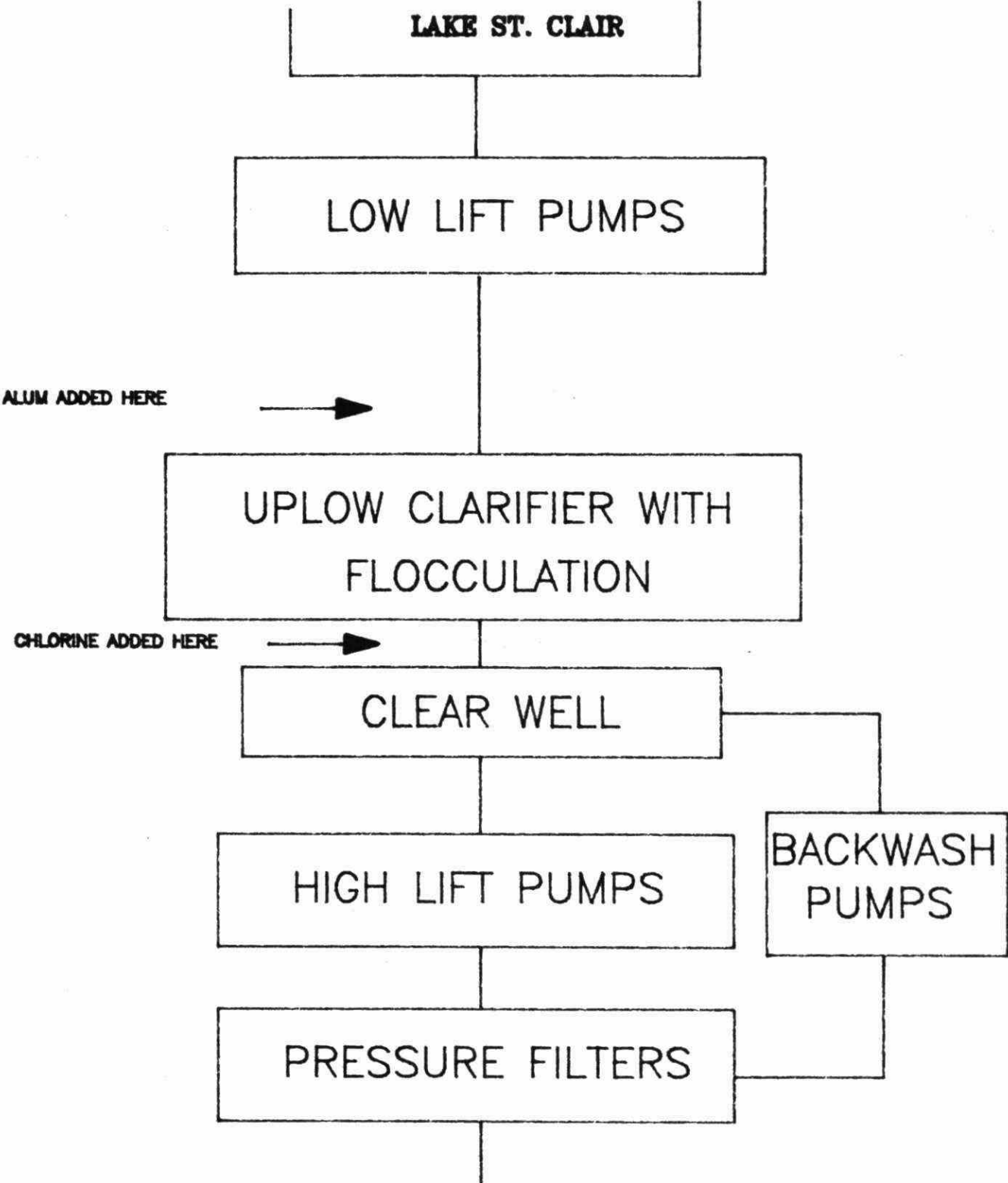
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

STONEY POINT WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### STOUFFVILLE WATER SUPPLY 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Stouffville Water Supply is a groundwater source and consists of three wells. Two wells are used regularly and the third only during peak months. Water from all three wells mixes in one treated water reservoir. The only treatment process applied is chlorination.

Water samples were taken on a monthly basis at Well #5, Well #6 and the reservoir. The Stouffville Water Treatment Supply was sampled, for approximately 160 parameters, monthly during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

The September treated water sample contained Total Coliform bacteria above the ODWO of 5 counts per 100ml. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Stouffville Water Supply System produced good quality water.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM

## WHITCHURCH-STOUFFVILLE TREATED WATER

## SUMMARY TABLE BY SCAN (1987)

SCAN	TREATED		
	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	28	8	28
CHEMISTRY (FLD)	33	33	100
CHEMISTRY (LAB)	133	79	59
METALS	140	59	42
CHLOROAROMATICS	91	0	0
CHLOROPHENOLS	6	0	0
PAH	51	0	0
PESTICIDES & PCB	171	0	0
PHENOLICS	7	0	0
SPECIFIC PESTICIDES	81	0	0
VOLATILES	140	22	15
TOTAL	881	201	

COLIFORMS WERE PRESENT IN ONE TREATED WATER SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### SUDBURY (RAMSEY LAKE) WATER SUPPLY 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Sudbury (Ramsey Lake) Water Supply is a pumping station that disinfects, fluoridates and adjusts pH for the water from Ramsey Lake. This supply along with the Wanapitei Water Treatment Plant serves a population of 95,000 and has a design capacity of 50 x 1000m<sup>3</sup>/day.

Samples of two distribution system sites were taken eight times in 1987 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Pesticides and PCB, Specific Pesticides and Volatiles). While some Specific Pesticides results were reported, samples were not submitted for Chlorophenol analysis.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Sudbury (Ramsey Lake) Water Supply produced good quality water throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY, RAMSEY LAKE W.T.P.

## SUMMARY TABLE BY SCAN (1987)

SCAN	SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	21	3	14	48	14	29
CHEMISTRY (FLD)	51	51	100	74	74	100
CHEMISTRY (LAB)	182	161	88	296	257	86
METALS	214	111	51	318	168	52
CHLOROAROMATICS	65	0	0	104	0	0
PESTICIDES & PCB	128	0	0	203	0	0
SPECIFIC PESTICIDES	54	0	0	81	0	0
VOLATILES	167	20	11	252	29	11
TOTAL	882	346		1376	542	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
SUDBURY (WANAPITEI) WATER SUPPLY  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Sudbury (Wanapitei) Water Treatment Plant is a direct filtration plant that treats water from the Wanapitei River. The treatment process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant along with the Ramsey Lake Water Supply serves a population of 95,000 and has a design capacity of 37 x 1000m<sup>3</sup>/day.

Samples of two distribution system sites were taken nine times in 1987 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Pesticides and PCB, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the distributed supply from the Sudbury (Wanapitei) Water Treatment Plant was of good quality.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      SUDBURY (WANAPITE)

## SUMMARY TABLE BY SCAN (1987)

SCAN	SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	19	4	21	21	3	14
CHEMISTRY (FLD)	24	24	100	28	28	100
CHEMISTRY (LAB)	224	201	89	225	197	87
METALS	267	126	47	273	144	52
CHLOROAROMATICS	91	0	0	91	0	0
PESTICIDES & PCB	175	0	0	175	0	0
SPECIFIC PESTICIDES	63	0	0	63	0	0
VOLATILES	196	21	10	196	21	10
TOTAL	1059	376		1072	393	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

EXECUTIVE SUMMARY  
DRINKING WATER SURVEILLANCE PROGRAM  
EASTERLY WATER TREATMENT PLANT  
1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Easterly Water Treatment Plant is a direct filtration plant that treats water from Lake Ontario. The process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant, in conjunction with the R.C. Harris and R.L. Clark plants, serves a population of approximately 2,333,000 people and has a design capacity of 550 x 1000m<sup>3</sup>/day.

Water samples from the raw and treated sites were taken on a monthly basis. Two sites from the distribution system were incorporated onto the program in July and were sampled on a monthly basis. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Coliform bacteria were present in the August distribution system Site 1 sample. The District Officer was notified. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Easterly Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      EASTERLY WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

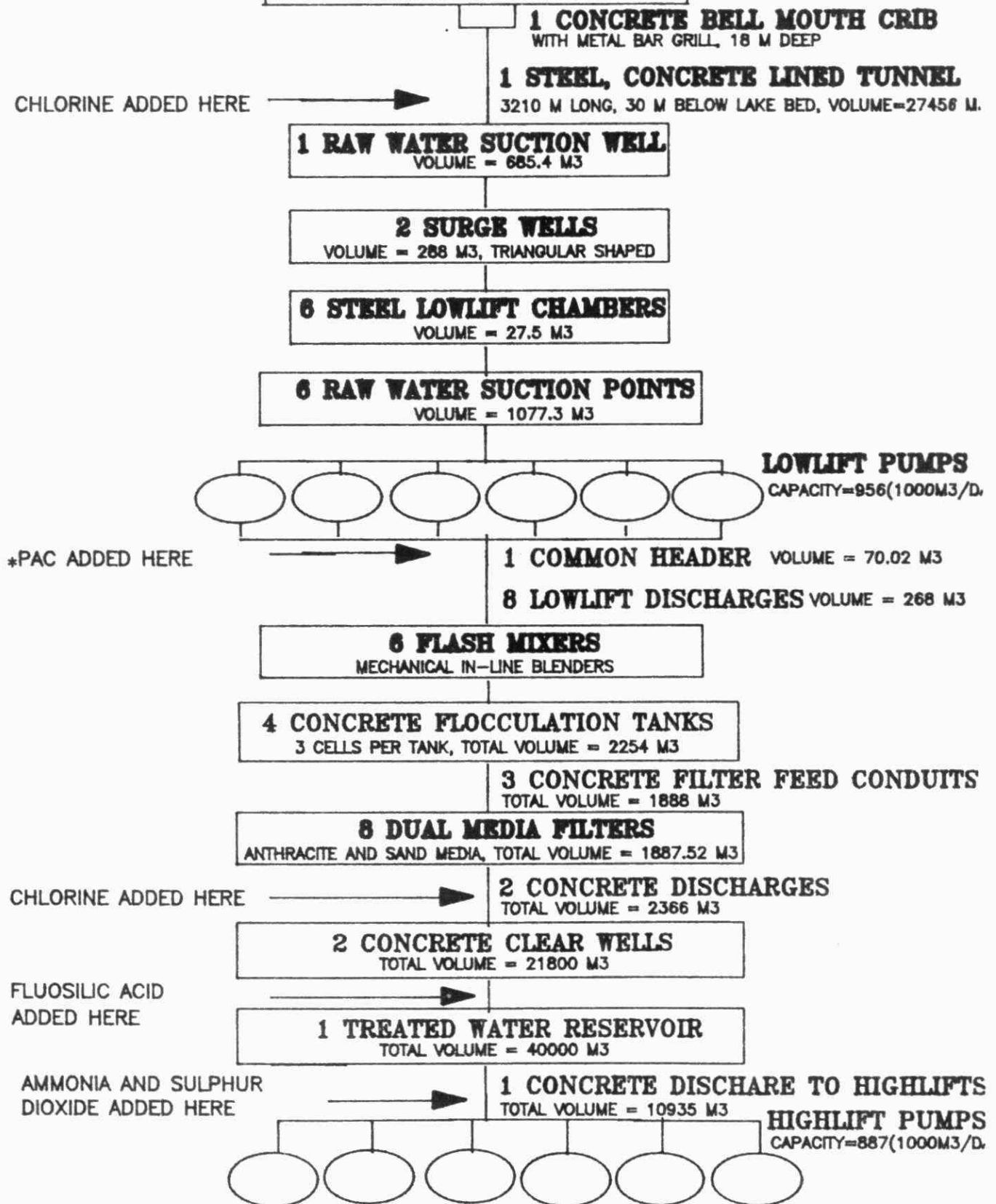
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	45	40	88	48	13	27	29	9	31	24	4	16
CHEMISTRY (FLD)	36	36	100	60	60	100	58	58	100	56	56	100
CHEMISTRY (LAB)	225	180	80	225	174	77	198	179	90	182	158	86
METALS	243	130	53	228	110	48	234	124	52	215	117	54
CHLOROAROMATICS	156	0	0	156	0	0	65	0	0	78	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	295	0	0	295	0	0	126	0	0	148	0	0
PHENOLICS	12	0	0	12	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	153	0	0	153	0	0	45	0	0	45	0	0
VOLATILES	339	1	0	337	48	14	168	24	14	167	24	14
TOTAL	1567	387		1577	405		923	394		915	359	

COLIFORMS WERE DETECTED IN ONE DISTRIBUTION SYSTEM SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# EASTERLY WATER TREATMENT PLANT LAKE ONTARIO



\* Polyaluminum Chloride

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### R. C. HARRIS WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The R. C. Harris Water Treatment Plant is a conventional treatment plant that treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant, in conjunction with the R.L. Clark and Easterly plants, serves a population of approximately 2,333,000 people and has a design capacity of 1000 x 1000m<sup>3</sup>/day.

Water samples from the raw and treated sample sites were taken on a monthly basis. Two sites from the distribution system were incorporated onto the program in July and were also sampled on a monthly basis. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the R. C. Harris Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM R. C. HARRIS WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	42	38	90	45	9	20	16	4	25	20	4	20
CHEMISTRY (FLD)	36	36	100	60	60	100	40	40	100	50	50	100
CHEMISTRY (LAB)	223	188	84	169	125	73	116	103	88	165	141	85
METALS	243	132	54	203	99	48	137	83	60	195	106	54
CHLOROAROMATICS	156	0	0	130	0	0	52	0	0	65	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	34	0	0	.	.	.	.	.	.
PESTICIDES & PCB	295	0	0	244	0	0	100	0	0	125	0	0
PHENOLICS	12	0	0	9	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	153	0	0	135	0	0	36	0	0	45	0	0
VOLATILES	338	1	0	254	37	14	112	16	14	140	21	15
TOTAL	1561	395		1295	330		609	246		805	322	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# R.C. HARRIS (TORONTO) WATER TREATMENT PLANT

LAKE ONTARIO

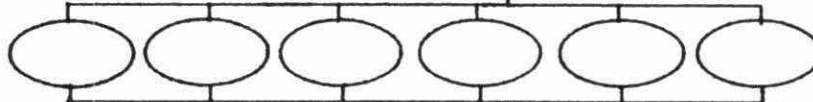
2 CONCRETE BELL MOUTHS 5 M DEEP  
2650 M LONG, 2.4 M DIA., TOTAL VOLUME = 12487 M<sup>3</sup>

1 STEEL, CONCRETE LINED TUNNEL  
1000 M LONG, 3 M DEEP, VOLUME=7302.5 M<sup>3</sup>

1 CONCRETE SURGE WELL  
VOLUME = 621.4 M<sup>3</sup>

1 CONCRETE LOWLIFT CHAMBER  
VOLUME = 756.6 M<sup>3</sup>  
8 TRAVELLING SCREENS AT EDGE OF CHAMBER

CHLORINE ADDED HERE



LOWLIFT PUMPS  
TOTAL = 1285 (1000 M<sup>3</sup>/DAY)  
CAPACITY

STEEL LOWLIFT DISCHARGE  
CONTINUE TO A CONCRETE DISCHARGE 3801 M<sup>3</sup>  
TOTAL VOLUME = 1773 M<sup>3</sup>

6 CONCRETE FLOCCULATION TANKS  
12 COMPARTMENTS PER TANK  
TOTAL VOLUME = 28703 M<sup>3</sup>

6 CONCRETE SEDIMENTATION TANKS  
TOTAL VOLUME = 12440.0 M<sup>3</sup>

2 CONCRETE FILTER FEED CHANNELS  
VOLUME = 3030 M<sup>3</sup>

40 FILTERS  
40 DUAL MEDIA WITH ANTHRACITE, SAND AND GRAVEL  
TOTAL VOLUME OF ALL 40 FILTERS = 6029.71 M<sup>3</sup>

CHLORINE AND FLUOSILIC  
ACID ADDED HERE

2 FILTER HEAD CONDUITS  
TOTAL VOLUME = 2270 M<sup>3</sup>

1 CONCRETE CLEAR WELL  
TOTAL VOLUME = 56138 M<sup>3</sup>

AMMONIA AND SULPHUR  
DIOXIDE ADDED HERE

2 CONCRETE DISCHARGES  
VOLUME=910 M<sup>3</sup>



HIGHLIFT PUMPS TOTAL CAPACITY = 923 (1000 M<sup>3</sup>/DAY) ALL PUMPS ARE ELECTRIC

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### R.L. CLARK WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The R. L. Clark Treatment Plant is a conventional treatment plant that treats water from Lake Ontario. The treatment process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant, in conjunction with the R.C. Harris and Easterly plants, serves a population of approximately 2,333,000 people and has a design capacity of 655 x 1000m<sup>3</sup>/day.

Water samples from the raw and treated sites were taken on a monthly basis. Two sites from the distribution system were incorporated onto the program in July and were also sampled on a monthly basis. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in November only.

A summary of results is shown in Table 1.

The July distribution system Site 1 water contained Coliform bacteria. The District Officer was notified. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were all below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the R. L. Clark Water Treatment Plant produced a good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM R. L. CLARK WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

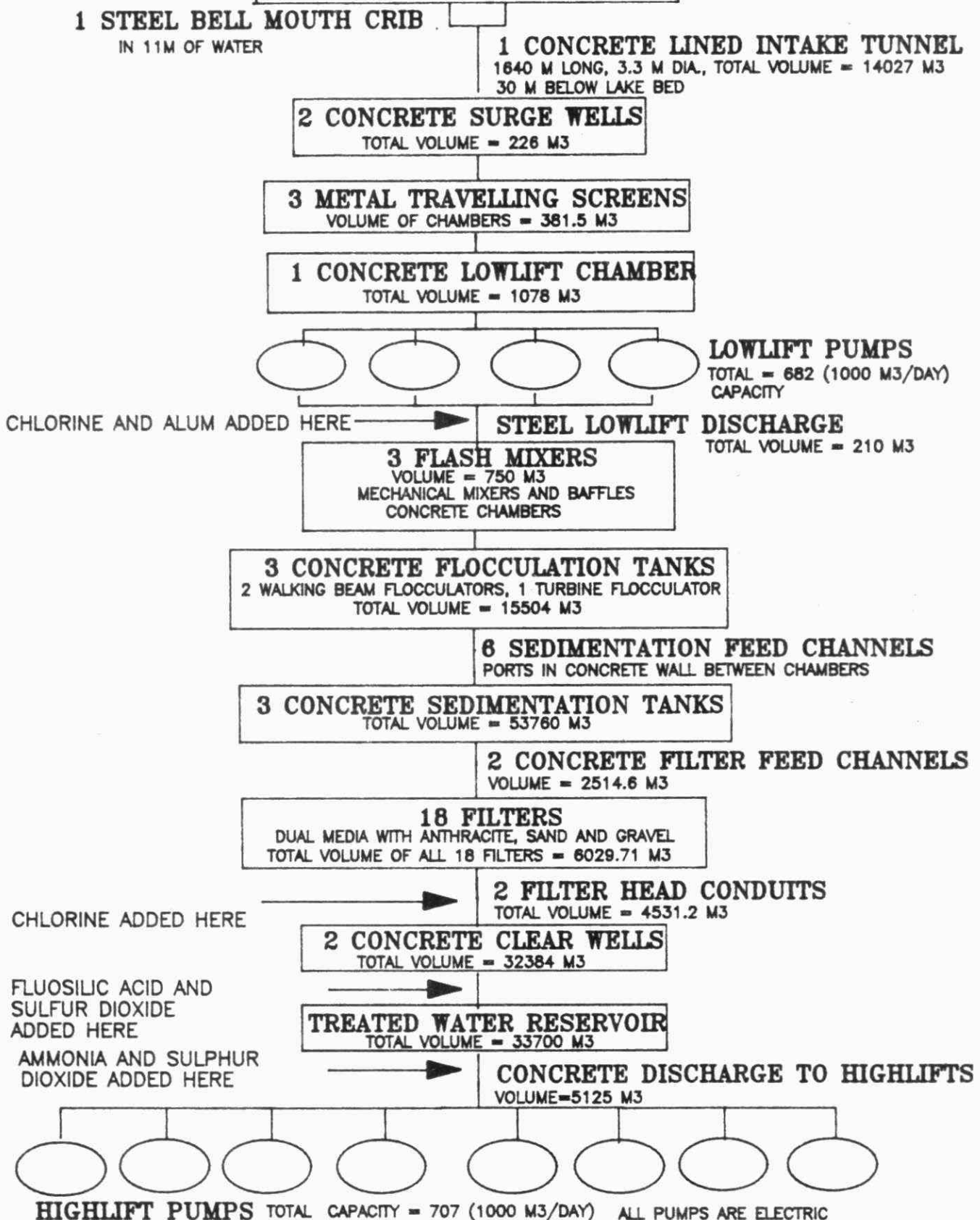
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	43	41	95	48	11	22	25	10	40	21	6	28
CHEMISTRY (FLD)	36	36	100	72	72	100	59	59	100	51	51	100
CHEMISTRY (LAB)	225	192	85	225	167	74	165	147	89	198	173	87
METALS	243	136	55	243	126	51	195	111	56	218	118	54
CHLOROAROMATICS	130	0	0	156	0	0	65	0	0	78	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	0	0	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	250	0	0	295	0	0	123	0	0	148	0	0
PHENOLICS	12	0	0	12	1	8	.	.	.	.	.	.
SPECIFIC PESTICIDES	153	0	0	153	0	0	36	0	0	45	0	0
VOLATILES	311	3	0	338	48	14	140	20	14	168	26	15
TOTAL	1466	408		1605	425		808	347		927	374	

COLIFORMS WERE PRESENT IN ONE TREATED WATER. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

Figure 2

# R.L. CLARK(TORONTO) WATER TREATMENT PLANT LAKE ONTARIO



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### UNION (GOSFIELD SOUTH) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Union (Gosfield South) Water Treatment Plant is a conventional treatment plant with solids contact upflow clarification. It treats water from Lake Erie. The treatment process consists of screening, coagulation, flocculation, clarification, filtration and disinfection. This plant serves a population of approximately 45,000 people and has a design capacity of 68 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 10 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. The ODWO for Total Coliforms was exceeded in one sample of treated water. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Union (Gosfield South) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      UNION (GOSFIELD SOUTH)

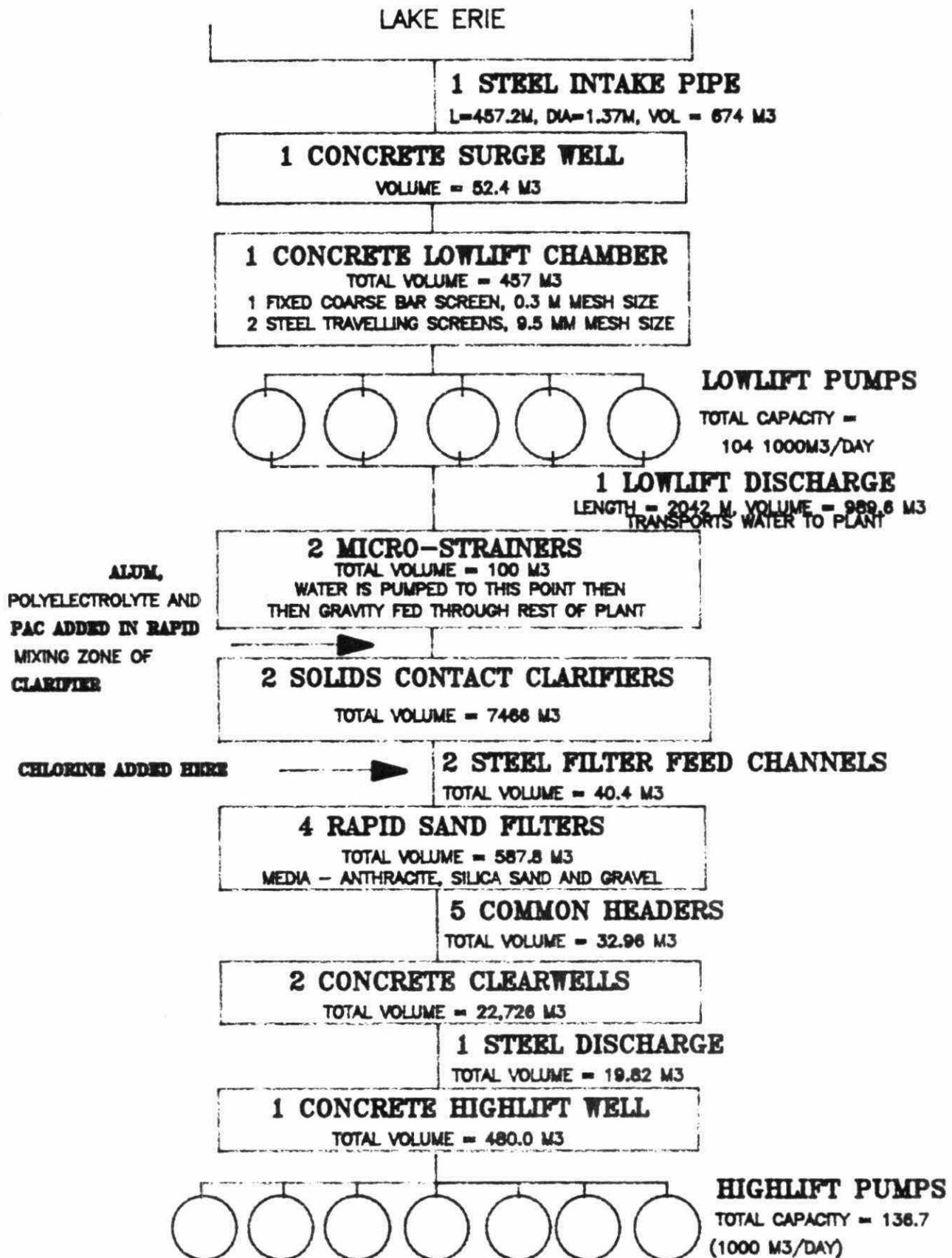
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	35	33	94	46	13	28	40	9	22	35	9	25
CHEMISTRY (FLD)	30	30	100	60	60	100	110	110	100	117	117	100
CHEMISTRY (LAB)	190	165	86	190	123	64	330	262	79	330	252	76
METALS	200	109	54	185	83	44	390	195	50	390	173	44
CHLOROAROMATICS	130	0	0	130	0	0	130	1	0	130	1	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	51	4	7	51	0	0	.	.	.	.	.	.
PESTICIDES & PCB	250	0	0	250	0	0	249	0	0	250	0	0
PHENOLICS	10	1	10	10	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	143	0	0	143	0	0	90	0	0	90	0	0
VOLATILES	280	0	0	279	40	14	251	36	14	280	40	14
TOTAL	1331	342		1356	319		1590	613		1622	592	

THE ODWO FOR TOTAL COLIFORM WAS EXCEEDED IN ONE TREATED WATER SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

**FIGURE 2  
UNION WATER TREATMENT PLANT**



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM

#### WALLACEBURG WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Wallaceburg Water Treatment Plant is a conventional treatment plant that treats water from the St. Clair River via the Chenal Ecarte. The treatment process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant serves a population of 11,300 people and has a design capacity of 13.5 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analyzed for approximately 160 parameters, 14 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Coliforms were present in the August distribution system Site 1 water. The District Officer was notified. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOS) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOS.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Wallaceburg Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM      WALLACEBURG WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

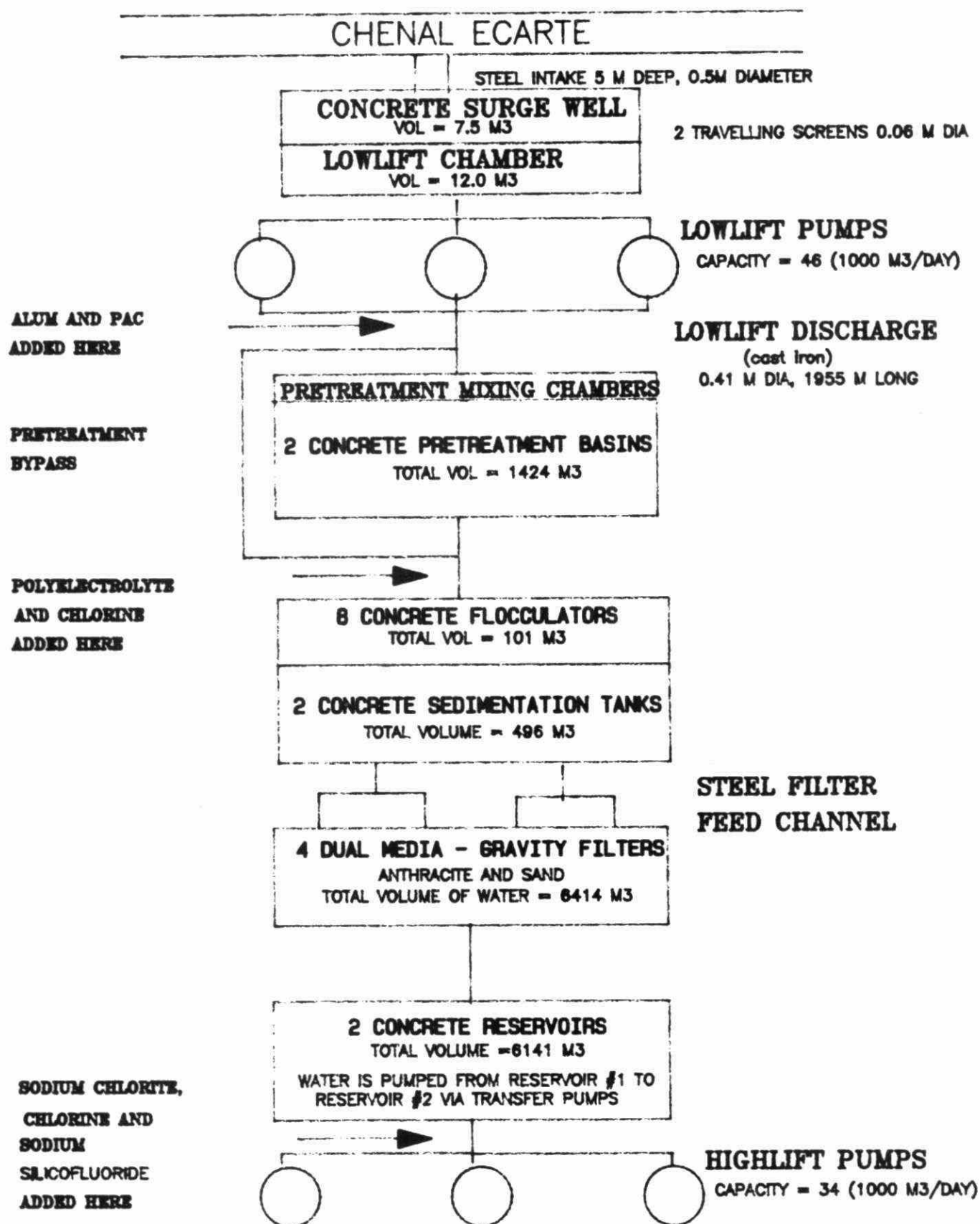
SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	46	46	100	50	7	14	43	10	23	36	6	16
CHEMISTRY (FLD)	39	39	100	82	82	100	144	144	100	140	140	100
CHEMISTRY (LAB)	242	204	84	259	171	66	392	317	80	376	301	80
METALS	263	135	51	284	118	41	431	224	51	414	214	51
CHLOROAROMATICS	169	0	0	182	0	0	143	0	0	156	0	0
CHLOROPHENOLS	6	0	0	12	0	0	.	.	.	.	.	.
PAH	34	0	0	68	0	0	.	.	.	.	.	.
PESTICIDES & PCB	320	0	0	344	0	0	273	0	0	297	0	0
PHENOLICS	13	1	7	14	0	0	1	0	0	1	0	0
SPECIFIC PESTICIDES	143	0	0	170	0	0	98	0	0	107	0	0
VOLATILES	338	1	0	395	60	15	338	50	14	339	50	14
TOTAL	1613	426		1860	438		1863	745		1866	711	

COLIFORMS WERE DETECTED IN ONE DISTRIBUTION SYSTEM SAMPLE. NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A "." INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# WALLACEBURG WATER TREATMENT PLANT SCHEMATIC



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Walpole Island Water Treatment Plant is a conventional treatment package plant which treats water from the St. Clair River. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of 1,900 people (21,000 in the summer months) and has a design capacity of 2.51 x 1000m<sup>3</sup>/day.

Raw and Treated water samples were taken monthly and were analyzed for approximately 160 parameters nine times in 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November.

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were all below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Walpole Island Water Treatment Plant produced good quality water at the plant.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

WALPOLE ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	31	31	100	27	6	22
CHEMISTRY (FLD)	27	27	100	53	53	100
CHEMISTRY (LAB)	170	133	78	170	109	64
METALS	181	90	49	166	81	48
CHLOROAROMATICS	117	0	0	104	0	0
CHLOROPHENOLS	12	0	0	6	0	0
PAH	68	0	0	68	0	0
PESTICIDES & PCB	222	0	0	200	0	0
PHENOLICS	8	0	0	8	0	0
SPECIFIC PESTICIDES	133	0	0	127	0	0
VOLATILES	253	0	0	252	39	15
TOTAL	1222	281		1181	288	

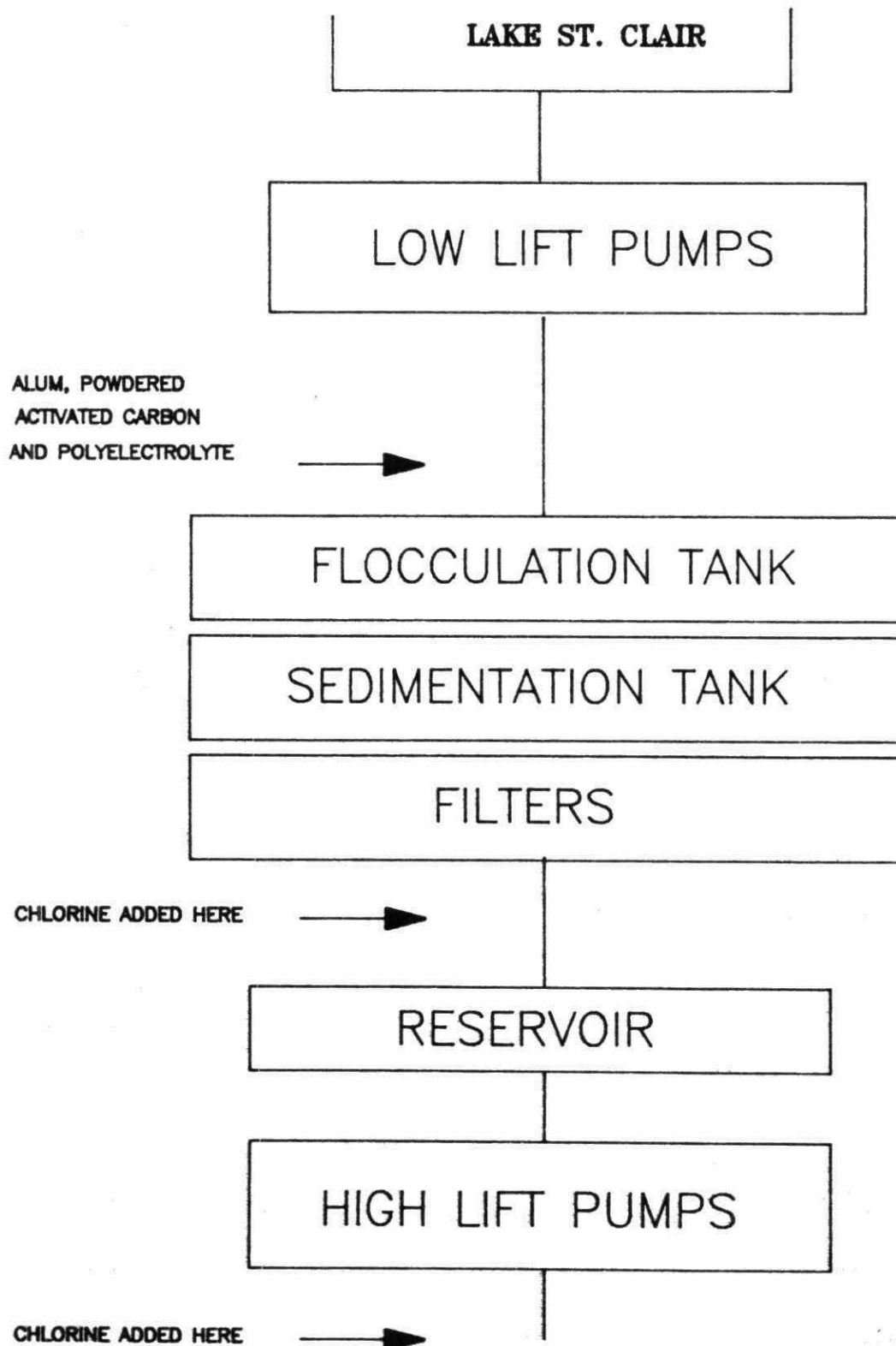
NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2

# WALPOLE ISLAND WATER TREATMENT PLANT



## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM WINDSOR WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Windsor Water Treatment Plant is a conventional treatment plant which treats water from the Detroit River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 222,700 people and has a design capacity of 273 x 1000m<sup>3</sup>/day.

Water samples from the raw, treated and two distribution system sites were taken on a monthly basis. Sampling at both distribution system sites was initiated in the spring of 1986. The Windsor Water Treatment Plant was sampled for 160 parameters, monthly during 1987. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed for in June and November only.

A summary of results is shown in Table 1.

Coliform was present in one distribution system Site 2 water sample. The District Officer was notified. Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water, however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters were below any applicable health related ODWOs except on two occasions where the ODWO for Turbidity and Lead were exceeded. The District Officer was notified in each case.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances analysed for were naturally-occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Windsor Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM      WINDSOR WATER TREATMENT PLANT

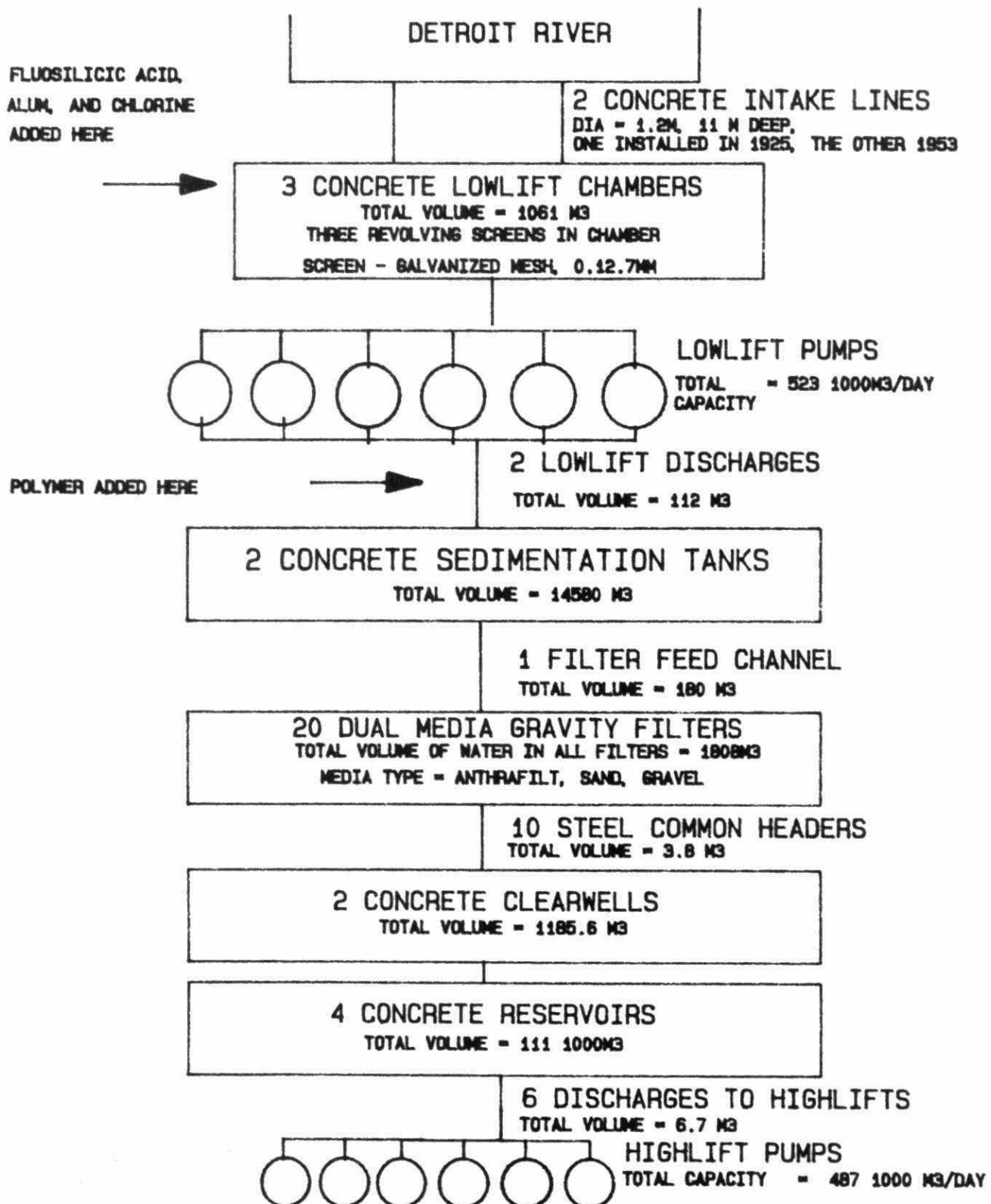
## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	49	49	100	59	21	35	44	11	25	49	20	40
CHEMISTRY (FLD)	39	39	100	77	77	100	135	135	100	126	126	100
CHEMISTRY (LAB)	243	216	88	240	171	71	393	312	79	393	322	81
METALS	263	148	56	263	122	46	471	252	53	471	238	50
CHLOROAROMATICS	169	0	0	169	0	0	143	0	0	156	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	68	0	0	68	0	0	.	.	.	.	.	.
PESTICIDES & PCB	322	0	0	322	0	0	273	0	0	297	0	0
PHENOLICS	12	0	0	13	0	0	1	0	0	1	0	0
SPECIFIC PESTICIDES	170	0	0	170	0	0	98	0	0	108	0	0
VOLATILES	366	3	0	365	53	14	337	50	14	337	52	15
TOTAL	1713	455		1758	444		1895	760		1938	758	

THE ODWO FOR BOTH LEAD AND TURBIDITY WAS EXCEEDED ONCE DURING 1987 COLIFORMS WERE PRESENT IN ONE TREATED WATER

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
A "." INDICATES THAT NO SAMPLE WAS TAKEN

FIGURE 2  
WINDSOR WATER TREATMENT PLANT



**TD  
367  
.D75  
1989**

Drinking water surveillance  
program : overview annual  
report 1987 /

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